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Comparison of State Banks to Other Banks in China
Srovnání státních bank s ostatními bankami v Číně

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List of Annexes
Annexes

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"I hereby declare that I have elaborated the entire thesis including annexes myself."

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Contents:

1 Introduction

When we talk about the banks, it is necessary to consider the stabilization of banking industry. As the lifeblood of economic activities, banking industry plays a major role in lending and depositing money. The stability of banking industry is more and more important for everyone. We also talk about the bank's performance, which is regarded as the most important indicator to evaluate the stability of banking industry. Considering financial analysis methodology, financial ratios are mathematical comparison of financial statement accounts and are the most widespread tools by bank managers to assess banks' performance. So applying financial ratios methodology to estimate banks' performance is significant and valuable to be introduced in this thesis.

The main aim of this thesis is to provide comparison of Chinese big four state owned commercial banks to other banks from 2010 to 2014 by specially analyzing different financial indicators (profitability ratios, credit risk ratios, capital adequacy ratios and so on).

For achieving this aim, we will divide the thesis into three major parts. Firstly, we will concentrate on making briefly introduction of basic information of big four state owned commercial banks and other banks. Then, we will describe the financial ratios, including their functions and calculation process. Lastly, with the purpose to finish the calculation, all of the relevant data used to measure the financial ratios of selected banks will be chosen in the annual reports from 2010 to 2014 and the official authorities in recent decades. We can compare the performance of big four state owned banks to other selected banks by using these data and financial ratios methodology.

The chapter 2 in this thesis is about the comprehensively introduction of characteristics of banking industry and Chinese banking system. In this chapter, major types of banks, regulation of banking industry, new trend of banking industry, role and basic functions will be briefly represented. After that, we will introduce the different participants in Chinese banking industry, especially the big four state owned commercial banks and other listed banks.

In chapter 3, we will deal with the methodology applied in this thesis. The key point of this chapter will be the various financial ratios. We will analyze several significant kinds of ratios indicators: profitability ratios, credit risk ratios, liquidity ratios, market risk ratio, efficiency and employee productivity ratio, risk index, probability of financial insolvency and capital adequacy ratios. At the end of this chapter, we will also introduce the net stable funding ratio, liquidity coverage ratio and leverage ratio.

The chapter 4 is the core practical part of this thesis. We will concentrate on comparing performance of big four state owned commercial banks to other 6 listed banks during the period from 2010 to 2014. We will choose the related data in the annual report from 2010 to 2014 and put the data into calculation by using some financial ratios mentioned in chapter 3. Meanwhile, we will find other data in the network of monetary authorities in order to help the analysis and comparison of banks' performance. Finally, we will summarize the estimated results and make the conclusion of this chapter.

The last chapter is the conclusion of the whole thesis, we will conclude all the results discussed previously.

2 Characteristics of Banking Industry and Banks in China

Banks provide hundreds of different services to millions of people, business and governments all over the world. Banking industry was deemed as the most vital sector of economic activity. The health and stable of economy is closely related to banking industry. In this chapter, we focus on main features of banking industry, such as the types, new trend and regulation of banks. We also describe Chinese banking system, which consists of role of Chinese government, central bank, big four state owned banks, and other banks.

2.1 Characteristics of banking industry

Banking industry is an enormous sector of business and finance that has exist in human civilization in some form for thousands of years. Though there is some evidence of a banking industry in ancient Greece and throughout other early civilizations, the Middle East and Asia are believed to have played an important part of the development of a banking industry. The foundations of modern banking industry can be traced to 14 century Italy, then banks sprang up throughout Europe during the following centuries. In that time, banks were established by wealthy families to lend and invest money on trade and commerce. In the modern world, the banking industry plays a large part in financial dealings, as it is a major and popular means for investing, borrowing, and storing money.

The most basic feature of a bank is to provide customers with a safe, guaranteed record of their accumulated money, usually done through a checking account that can be easy withdrawal and deposit. Banks play an important part in investing and loaning money. Most banks can use funds deposited to loan out money or make investment, this practice allows a constant flow of lending and borrowing that keeps money circulating throughout the economy.

2.1.1 Types of banks

According to the types of customers served and range of business, there are different types of banks, which can be classified as retail banks, wholesale banks, private banks, investment banks, universal banks, commercial banks and specialist banks.

Retail banking is known as "consumer banking" by providing services for individual consumers. Many retail banks also offer services to small and medium enterprises. Consumer deposits collected by retail banks is an important source of funding for most banks. Services of retail banks include saving and transactional accounts, personal loan, mortgage, traveler's cheques, certificate of deposit, debit card, ATM card and credit card. Retail banks have different specializations, like saving and loan banks, credit union, private banks, offshore banks, correspondent banks and postal banks.

- **Saving and loan banks**, also known as thrift industry, are responsible to meet consumers' needs, including mortgage, home equity and cars. Saving and loan banks focus on local and regional business, rather than national and international clients. The entire reason for development of saving and loan banks is being help to provide financial assistance to residential customers.
- **Credit union** are non-profit financial corporative, controlled by its members. Credit unions accept deposits from their members and use them to make short-term loans. Deposits are regarded as purchases of shares, and all earnings of the credit union are paid out as dividends to members.
- **Private banking** provide investment, limited tax advisory services, directly wealth management services and other financial services to high net worth individuals with high level of income or invest sized assets. The famous private banks in the world are JPMorgan, CITI private bank and so on.
- **Postal banks**, always associate with postal system, are providing business limited by small denomination to customers in post office. It is continence for customers to pay utility bills through them.

- **Offshore banks** are the banks located outside the country of depositors. On account of different tax policies from country to country, this kind of bank could provide potential benefits for customers.

Wholesale banks deal with lending and borrowing between large institutions. The development of wholesale banks is that retail banks cannot trade the large sum of money for high number of financial transactions daily. Wholesale banking is different from retail banking, in that the former focuses more on corporate style entities and high value transactions, while the latter is focused on providing financial services to individual consumers. Thus, a bank will typically engage in both wholesale and retail banking. Wholesale banking is also an option that is open for real estate developers, market investors, and others that operate in the buying and selling of properties and other forms of investment.

Investment banks specialized in helping individuals, governments and corporations to raise capital by underwriting, acting as an intermediary between a securities issuer and the investing public, facilitating mergers and other corporate reorganizations and acting as a broker or financial adviser for institutional clients. Major investment banks include Goldman Sachs, Deutsche Bank, JP Morgan, Morgan Stanley and Citibank. Some investment banks specialize in particular industry sectors. and have retail operations for small, individual customers.

Universal banks are the financial institutions offering many kinds of banking activities and is both a commercial banking and an investment banking. Universal banking is common in some European countries, such as Switzerland. In the United States, however, banks are required to separate their commercial and investment banking services. However, **specialized banks** are established for financing certain economic sectors, such as industrial activities, real estate and agriculture.

Commercial banks are financial institutions that accept deposits, offer checking account services, make business, personal and mortgage loans; and offer basic financial products like certificates of deposit and savings accounts to private individuals and small businesses. The significant difference between commercial banks and investment

banks is that the former refers to the securities underwriting and securities related services, while the latter relates to the deposit and lending business.

Central banks are authoritative institutions that manage state's monetary policy, monitor financial institutions. The functions of central banks are: to manage monetary policy with the aim of achieving price stability, to prevent liquidity crisis, and to ensure smooth functioning of financial system. The central banks control the issue of notes and coins, have the power to control the amount of credit money created by banks, and hold governments' bank accounts and perform certain some traditional banking services for governments.

Correspondent banks are more likely used to conduct business in foreign countries and act as the domestic banks' agent abroad because the domestic bank may have limited access to foreign financial markets and cannot service its client accounts without opening up a branch in another country. They conduct business transactions, accept deposits and gather documents on behalf of other financial institutions. Correspondent banking is an essential component of the global payment system, especially for cross-border transactions.

2.1.2 Role and basic functions of banks

Banks are financial intermediaries channel funds from people who have extra money to those who do not have enough money to carry out desired activities. As one of the traditional intermediaries (insurance companies, mutual funds, brokers and dealers) in financial markets, banks provide safe places to keep money and opportunities to earn interests for depositors, and lend money to different entities funding capital for investment, consumption and so on. Banks also derive profits from spread of lending rate and deposit rate.

Deposits typically have the features of low risk, small size and high liquidity and loans are of large size, high risk and illiquid. Banks can do so by performing the transformation function: size transaction, maturity transaction and risk transaction. Fractional reserve banking system (keeping a relatively small proposition of depositors' fund available for withdrawal) allows banks to create money.

Monetary creation. The process of creating additional money by repeatedly lending. Reserve requirements limit the amount of money an initial deposit can create. The higher reserve requirement, the less money bank can create.

Size transformation. Depositors are willing to lend small amount of money than the amount required by borrowers. Banks obtain deposits in the form of small size and the repackage them into large size loan. Banka perform size transformation function associated with lending and borrowing function, because banks collect large amount of deposits than any individual borrow.

Maturity transformation. Many investors are willing to lend only on a very short term basis, but many borrowers require very long term loan. Banks transform funds for a short term, in the form of deposit, to medium or long term, in the form of loan. This process may mismatch the assets and liabilities of banks. The maturity transformation function may cause liquidity risk, which means banks have insufficient liquid funds to meet their obligations.

Risk transformation. Individual borrowers will not able to repay the loan they borrowed. But depositors wish to receive the repayments when debt mature. Banks could minimize the credit risk by diversifying the investment, pooling risk, screening debt holders and keeping capital as reserves.

2.1.3 Regulation of banking industry

Bank regulation relates to the setting of specific requirements, restrictions and guidelines that bank have to abide by. Up until the early 20th century, there were still some countries where banking was unregulated, anyone able and willing to open a bank without any qualifications or permission. However, such banks have failed to repay their loans at all or in a timely manner. With the tendency of globalization, large complex banks try to open branches covering important financial centers and other big cities, they are so large and interconnected that their failure would be disastrous to the greater economic system. So avoiding bank risks is major concern not only for customers, bank shareholders and employees, but also for regulators and authorities in charge of the banking industry.

Effective bank regulation aims to meet the following objectives: Firstly, reducing system risk., which has the cascading effect on other bank even the whole sector. Secondly, providing small, retail clients with protection and protecting consumers against monopolistic exploitation. Monopolists could get advantages from consumers by raising prices to earn unwarranted profits. Regulators become influential in preventing few banks from too large.

There are three different types of regulation: systemic regulation, prudential regulation and conduct of business regulation.

Systematic regulation. Usually bank with low level of equity and regulatory capital level, risky loans, international managerial problems, weaken earnings, and limited funding sources receive additional regulatory monitoring. Systemic regulation goes under name of government safety net. *In particular, this safety net encompasses two main features –* ***deposit insurance*** *arrangements and the* ***lender-of last-resort*** *function. Deposit insurance is the arrangement that all or part of deposit will be paid when bank fails. The guarantee may be either explicitly given in law or regulation, offered privately without government backing or may be inferred implicitly from the verbal promises and/or past actions of the authorities. The lender-of-last-resort (LOLR) function is one of the main functions of a central bank. The central bank, or other central institution, will provide funds to banks that are in financial difficulty and are not able to access any other credit channel*[1].

Prudential regulation. Regulators set rules that gives banks incentives to follow strict operational standards and to avoid risk loans and focus on consumer protection, because consumers does not able to judge soundness and safety of financial institution resulting from imperfect information and agency problem. It relates to the monitoring and supervision of financial institution, with particular attention paid on asset quality and capital adequacy.

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[1]. CASU, B., GIRARDONE, C., MOLYNEUX, P. *Introduction to Banking*. 1 st ed. Harlow: Pearson Education Limited, 2006. 162 p. ISBN 10-0-273-69302-6.

Conduct of business regulation focuses on how banks operate their business and relates to information disclosures, fair business conduct, competence, honesty and integrity of banks and their employees. It concentrates on establishing rules to reduce possibilities that consumer receive bad advices, banks become insolvent before contracts mature, fraud and misrepresentation take place, and employees of banks act incompetently.

Bank regulation has the feature of complication and consists of licensing and supervision.

Banking Licensing can be defined as a process to determine whether entities have the ability to operate banks and the process involves an evaluation of entities' minimal required capital, liquidity, and management ability and so on. A banking license, issued by regulatory body, is the precondition for banks to provide banking services including taking deposit from the general public. There is a relatively long and complex procedure for banks to apply licenses. The procedure usually depends on different sectors banks may be involved, for example, retailing banking, investment banking.

Regulatory supervision consists the supervision of the bank's operation by central bank, government and other regulators. Regulatory supervision makes sure that the operations and functioning of the bank comply with the regulatory guidelines, requirement and restrictions that banks have obligations to obey when they receive their licenses.

2.1.4 New trend of banking industry

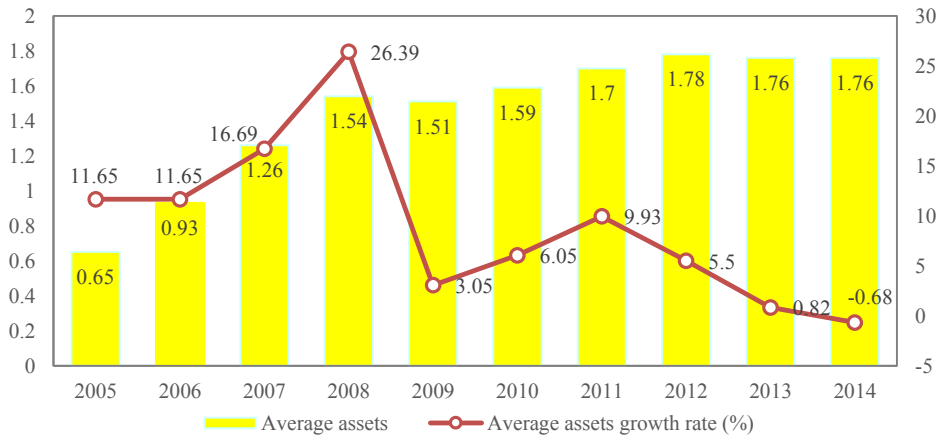
Since 2008, development models of pursuing scale expansion in international large banks has changed. The main development tendencies of banking industry are: fast development of emerging-market banks, slower assets growth rate in banking industry, adjustment of operation model, and regulation enhancement in banking industry. From the perspective of banking business in each country, the overall operational situation of US banking industry is sound, except for the decline of interest

margin. Banks in Eurozone have faced great challenge due to QE policy and Greek debt crisis.

Firstly, status of emerging-market banks has proved. Because of financial crisis and European sovereign debt crisis, there were big losses and rapid decline of assets shares in banks of developed countries. However, the crises had a relative small impact on emerging-market banks, these banks only need to solve the problems of economic slowdown or minor recession, as well as withdrawal of some foreign capital. Many European and American large banks invested so much in emerging market with the features of fast economic growth, lower level of financial development and large population. Emerging-market banking industry's growing economic strength is increasing apparent. On the basis of The Banker, the proportion of number of banks in developed countries to world top 1000 largest banks decreased from 69.0% to 55.7% between 2000 and 2010, the proportion of assets went from 87.7% to 80.3%, and the proportion of capital dropped from 82.6% to 74.7%. But the proportion of number of banks in emerging market to world top 1000 largest banks increased from 31.0% to 44.3% between 2000 and 2010, the proportion of assets raised from 12.5% to 19.6%, and the proportion of capital went up from 17.3% to 25.2%.

Secondly, the average assets growth rate is increasing slowly. In order to testify this viewpoint, we introduced some statistical data that shows the average assets of 30 global systemically important banks from 2005 to 2014.

Figure 2.1: Average assets of 30 G-SIBs from 2005 to 2014 ($ Trillion)



Source:http://pic.bankofchina.com/bocappd/rareport/201501/P020150113614098669643.pdf.

Before the financial crisis, international large banks increased their assets by developing new branches, merging and acquisitioning. We can see the figure 2.1, which shows that the average assets growth rate increased from 11.6% to 26.39% between 2005 and 2008.

The figure also shows average assets growth rate went up from 3.05% to 9.93% between 2009 and 2011, and fell to negative 0.68% in 2014. The total tendency of average assets was increasing steadily from 2009 to 2014. After the financial crisis, international large banks took measures to make the assets growth rate in a reasonable level. For example, United Bank of Switzerland only focused on three core business services (wealth management, investment banking and assets management), and abandoned services in other business areas. HSBC said it cut about 5000 jobs in 2011, and 25 thousand jobs before the end of 2013. The layoff mainly happened in the branches of USA and European Union, which helped the bank to save 2€ billion wage cost. By selling non-core assets, the capital scale of The Royal Bank of Scotland was decreased by 500£ billion.

Thirdly, operation mode of banking industry is changed and large banks gradually concentrated on core business.

The mixed operation of the commercial banks had already been the leading trend since late 1970s. The passage of the American Financial Service Modernization Act of 1999 marked a new era of financial multi-operation to come. But operation modes of financial institutions in US and Europe have been adjusted since the financial crisis. To strengthen the competitive advantage, the large banks striped the non-core business to keep their core business. For instance, United Bank of Switzerland restructured its operation and integrated financial management, assets management and investment banking, including selling wealth management services in US and financial services in Brazil in 2009. Societe Generale SA readjusted its development goals and plans, refocused on traditional business, and planned to sell more asset and trade related business in the future at the end of 2009. Citibank will exist its retail banking from Tokyo, Houston and Panama.

Fourthly, governments of many countries reinforced capital management and reconstructed financial governance framework.

In 1988, the Federal Reserve Board, representing USA, and representatives of other leading countries, announced agreement on new capital standards, usually referred to as Basel I. The Basel I stipulated that a ratio of core capital to total risk weighted assets should be greater than 4% and a ratio of total capital to total risk weighted assets should be greater than 8%. In 2004, Basel II, the second of the Basel Committee on Bank Supervision's recommendations, set the minimum capital requirements of financial institutions with the goal of ensuring institution liquidity. In 2009, the Basel Committee published Basel III, which paid more attention on liquidity risk, and banks' ability to deal with financial and economic stress. In 2011, the three European supervisory institutions began operations and replaced the Committees of Supervisors, they are European Banking Authority, European Securities and Market Authority and European Insurance and Occupational Pensions Authority. In 2012, the European Union required to supervise Eurozone banking industry with the core of European Central Bank.

2.2 Banking in China

In the first place, we would like to begin by pointing out that development process of Chinese banking industry has the feature of diversification and opalization.

In 1978, Imperial Bank of China was established as the first self-administrated bank in China. Then, Chinese banking system has experienced marked changes since 20th century. In the 1930s, the Chinese Nationalist Party created a financial system which the Central Bank, Bank of China, Bank of Communication, Farmers Bank of China, Central Trust Bureau and Central Corporative Bank of China were the core and official-merchant managed banks were the subsidiaries. In that time, there were many small or medium size privately owned banks and they were less influential.

People's Bank of China (PBC) was established in 1 December 1948, based on consolidation of Huabei Bank, Xibei Farm Bank and Beihai Bank. The Chinese Communist Party took over the bureaucratic capital banks and reorganized no-

governmental banks with passage of The Common Principle. Under the system of planned economy, every banks acted as departments of PBC, which not only performed functions of accepting deposits and offering loans like commercial bank but also defined monetary policy like central bank. In 1969, PBC was merged into Treasury Department as the result of wrong policy.

Although PBC was restored its position of independent ministry-level institution in 1978, there was no change of PBC acted as both commercial bank and central bank until 1979. From the beginning of 1979, Agricultural Bank of China (ABC), taking charge of rural financial services, has been restored with the passage of The Notice On Restoration of ABC from The State Council. Bank of China (BOC) has been separated from PBC to take charge of foreign exchange services. Meanwhile, China Construction Bank (CCB) has been separated from The Treasury Department to take over long term investment services and loan transaction services. In 1981, China Investment Bank was established to provide loan to international financial institutions. In 1983, The State Council promulgated that PBC should function as central bank in China in order to avoid financial risks and promote financial stability. Afterwards, Industrial and Commercial Bank of China (ICBC) was established to take over the commercial business of PBC.

In 1986, Bank of Communication was reorganized as state-controlled joint stock universal bank. Chinese government feared that four specialized banks took over both commercial credit and policy credit endangered macro-control of authority. Another 12 stock joint banks were established one after another. Postal saving business was enshrined in law, which subsequently led to establishment of Postal Saving Bank of China (PSBC) controlled by China Post Group Corporation.

In 1994, another three policy banks were established to take over policy directed lending functions. In 1995, PBC was legally confirmed by 8th National People's Congress. China Minsheng Bank, founded in 1996, is the first bank in China owned mostly by non-government enterprises. Chinese government promised to remove barriers for registration of foreign banks resulting from the entrance to WTO in 2002.

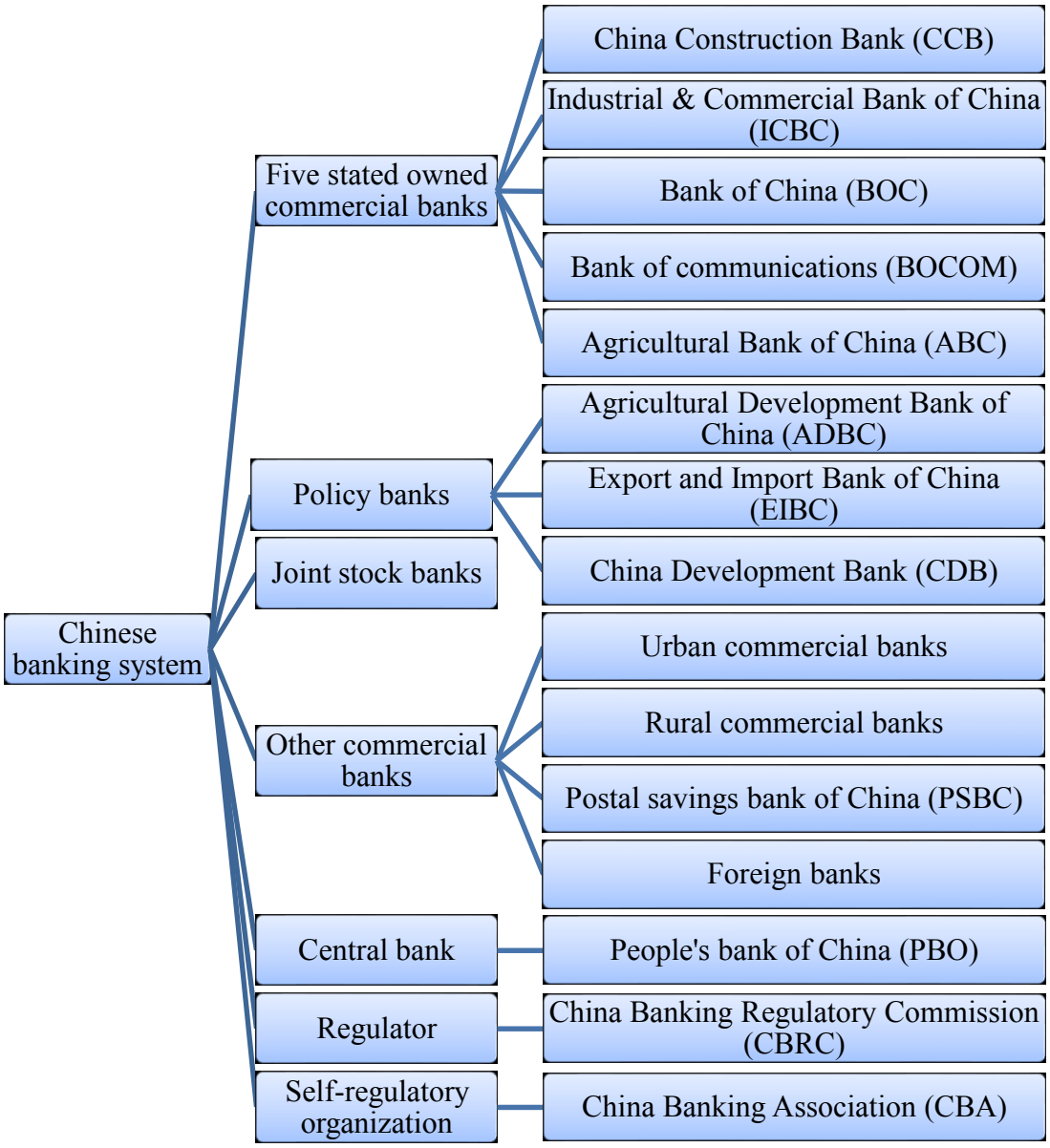
In 2003, the China Banking Regulatory Commission (CBRC) was established to take over the regulatory functions from PBC. China Banking Association, set up in 2000,

as a national banking industry self-regulatory and non-profit organization monitored by CBRC since 2003.

From then on, the recent banking system was nearly built up with the leader of PBC and backbone of four stated owned specialized banks.

We summarize the concise structure of Chinese banking industry in figure 2.2. More details would be included in the following.

Figure 2.2: Chinese banking system



2.2.1 Role of Chinese government

During recent decades, although Chinese government is also heading toward more market reforms shifting from a more state-oriented model towards a market-oriented model, the Chinese Government still has considerable control over its banking system, owning a majority of the largest banks, holding 65% stocks of commercial banks and having 95% actual assets control right. Under the government-led financial system, Chinese government directly control allocation of resources.

2.2.1.1 Impact of Chinese government in banking industry

Chinese government pays great attention to banking industry applying fiscal policies. Capital adequacy ratio and liquidity level were improved by expanding fiscal support of government, such as reduce tax and issue government securities. Business tax of commercial banks was decreased from 8% to 5%. Income tax of commercial banks shows a downward trend and declines from 55% to 33%. The outstanding balance of government bonds in the central budget from 2008 to 2012 totaled 5.33 trillion yuan, 7.2 trillion yuan, 6.75 trillion yuan, 7.2 trillion yuan and 7.6 trillion yuan.

Chinese financial system has get advantages from administrative macro-control policy. Especially in Asia financial crisis, Chinese government refused to devalue the RMB and took a series policies and measures to expand domestic demand (education, real estate and medical treatment) in order to stimulate economic growth. At the end of third quarter in 2015, Chinese banking industry reported 192.7 trillion yuan in domestic and overseas assets, including 77.9 trillion yuan in large scale commercial banks and 35.9 trillion yuan in joint stock commercial banks.

However, government intervention and high degree of monopoly for four big commercial banks in the banking industry lead to low efficiency in financial resources allocation, such as high non-preforming loan and shadow banking.

According to a sample survey of People's Bank of China, among all reasons causing non-preforming loan in banking industry, government plans and administrative innervation take 30%, default of state owned enterprises takes 30%, and the local government innervation takes 10%.

Firstly, on the side of government, banks have become the separate entities in name due to shareholding reform of state owned commercial banks. Banks can operate at their own risk and operate independently. Because of unsoundness legal system, there is non-preforming loan resulting from policy mistakes that some local governments have influence on banking management on the basis of management models under planned economy. If we are looking at the relationship between local government and banks for example, most branches of commercial banks are designed according to barrio, local governments turn into managers of banks' fund to some extent, and large funds are invested into state owned enterprises experiencing difficulties in production and business operation by following governments' wishes. In accordance with public available data, four-fifths of local governments' loans are provided by banks.

Secondly, Foreign banks continue to face stringent capital, liquidity and administrative requirements when opening a branch in China. China Banking Regulatory Commission (CBRC) requires that foreign banks have to operate a representative office in China for at least two years before they are allowed to open a branch in mainland China. Foreign banks can apply for only one new branch at a time. In this situation, Chinese banks have not enough motivation to improve their products and services.

Because Chinese government allocates much loans to state owned enterprises and it is inconvenient for non-state owned enterprises to get sufficient credit loan support, government agencies and state organizations are able to fund at low interest rate and financing difficulty is the major barrier for the development of middle or small sized companies. For covering the shortage of funds, many middle or small sized enterprises ask private lending and non-bank financial institutions for help. This is one of the important reasons that cause shadow banking problem in China. On the basis of evaluating from Deutsche Bank in 2013, the scale of Chinese shadow banking was 21 trillion yuan, which was equal to 40% of GDP. Chinese government tries to solve shadow banking problem by presenting new regulations. In 2011, CBRC required commercial banks to switch the business corporation between a bank and a trust company from off balance sheet into balance sheet with the limitation of loan to deposit ratio (no higher than 75%).

2.2.2 Central bank in China

The Bank of Amsterdam, established in 1609, is considered to be the first precursor to modern central banks. Central banks were established in most European countries during the 19th century. Central banks are essential parts of society and are responsible to monetary policy with the aim of achieving price stability, preventing liquidity crisis, and ensuring the smooth functioning of payment system. This subchapter, we briefly introduced central bank in China, and compared central banks of different regions to PBC by analyzing main components of total assets in central banks.

2.2.2.1 Introduction to PBC

People's Bank of China (PBC) is the central bank in China, with more financial assets than any single public institutions. PBC is the ministry of The State Council with the power of controlling monetary policy and regulating financial institutions in mainland China.

The Banking Law of China has stated characteristics and legal status of PBC: Firstly, according to banking law of China, PBC has authority to implement monetary policy and run its own operations without excessive involvement of government and social organizations. Secondly, the PBC shall practice a system wherein the governor assumes the full responsibility. The president of PBC is elected by National People's Congress, but the vice-president is appointed and removed by premier. Thirdly, PBC shall submit reports about monetary policies and the operation of financial industry to the Standing Committee of the National People's Congress. PBC shall exercise independently to control over its financial budget.

Now, the PBC established 36 regional branches, 2 headquarters in Beijing and Shanghai and 26 internal departments. The PBC also consists of 16 directly affiliated institutions: China National Clearing Center, China Foreign Trade System, Financial News, PBC Graduate School, China Gold Coin Corporation, China Banknote Printing and Minting Corporation and so on.

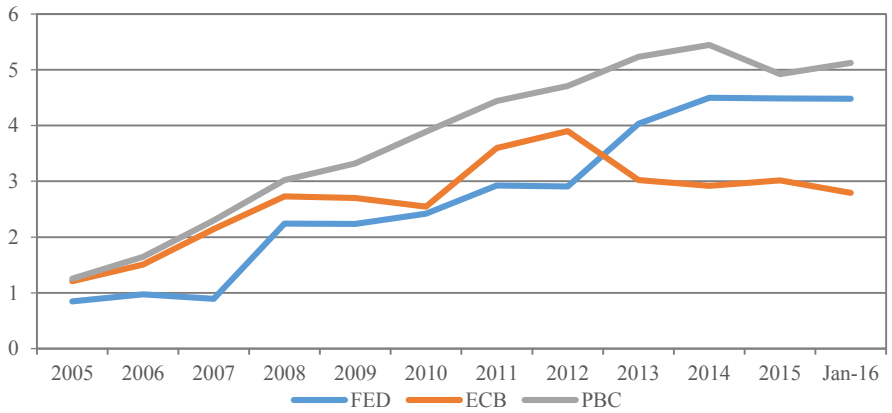
In the past several decades, reserve requirement, interest rate and rediscount have been used as the main monetary instruments by PBC. PBC also controls credit quota

related to regions and industries through the State owned commercial banks. In 1984, the reserve requirement system was set up by PBC. Over the past 20 years, the reserve requirement ratio has been adjusted for many times. On August 25, 2015, reserve requirement ratios were declined to 17.5% for large financial institutions and 14% for small and middle sized financial institutions. On April 11, 2015, the PBC kept its one-year lending rate at 5.1% and deposit interest rate at 2.25%, both of them were decreased by 0.25%. In addition, central bank expanded the floating range of deposit rates from 1.3 times of benchmark deposit rate to 1.5 times of benchmark deposit rate.

2.2.2.2 Comparison of PBC to other central banks

Since the American sub-prime mortgage crisis, most of the central banks around the world have stimulated economic growth applying loose monetary policy. The actual effect of monetary policy is different due to different macroeconomic environments, degree of monetary market development and concrete implementation of monetary policy. But the same results caused by loose monetary policy are the expansion of assets. Balance sheet is an important indicator to shows activities of central banks. By comparing assets of PBC and other central banks, we could get some information about how the central banks impact on economy.

Figure 2.3: Total assets of FED, ECB and PBC ($ Trillion)



Source: Official websites of FED, ECB, PBC.

The figure illustrates the total tendency of assets in three central banks. We attempt to make comparative analysis of three central banks from several aspects.

Since 2011, PBC has ranked first in terms of total assets among major central banks because of high share of foreign exchange and reserve requirement ratio.

The main component of total assets in PBC is foreign exchange, which ranged from 59.9% to 83.3% between 2005 and 2014. Such large amount of foreign exchange was directly purchased by PBC. Large amount of foreign exchange pushed the faster appreciation of RMB. PBC bought foreign exchange and sold RMB to balance the supply and demand of foreign exchange with the purpose of trying to keep the appreciation of RMB sharply controlled and strengthening its control of foreign exchange. Meanwhile, PBC held high reserve requirement ratio to kept large amount of deposit reserve. These are all reasons of rapidly expansion of balance sheet in PBC.

Foreign exchange increased rapidly from 2005 to 2011, but throughout the tendency of foreign exchange from 2011 onwards, the growth of foreign exchange has faced significant volatility. Foreign exchange declined by 0.68$ trillion during the period from 2015 to January 2016. PBC has continued to cut reserve requirement ratio several times due to this tendency. Chinese economists predicted that foreign exchange would be declining stably. In the future, both falling reserve requirement ratio and proportion of foreign exchange may lead to structural improvement of balance sheet in PBC.

It is noticeable that total assets of European Central Bank increased from 2.546$ trillion to 3.9$ trillion between 2010 to 2012 and went down to 2.922$ trillion in 2014.

In order to reduce liquidity pressure of banks resulting from debt crisis, in May 2010, ECB launched Securities Market Program (SMP), under which it purchased unspecified amounts of sovereign bonds in secondary market. The securities held for monetary purposes raised from 0.178$ trillion to 0.359$ trillion between 2010 and 2012. The 3-year Long-Term Refinancing Operations (LTROs) were implemented in 2010 and 2012. The value of LTROs increased from 0.394$ billion to 1.342$ billion between 2010 to 2012. At the same time, ECB provided large amount of loans to credit institutions with low interest rate.

The European Central Bank provide much money to banks through LTRO during debt crisis. After 2012, although banks restored to steady operation, real economy did not need much loan, the banks repay the debt to central bank. The monetary policy only made small influence on real economy. So total assets of European Central Banks declined from 2012 to 2014. In January 2015, European Central Bank announced to implement QE policy and continue to buy large amount of securities. The securities held for monetary policy was 806,280 € million, representing an increase of 588,379€ million. The QE policy forced the increase of total assets in 2015.

Total assets of FED showed gradually upward tendency during reporting period. As the main components of total assets in FED, U.S Treasury securities and mortgage-backed securities took great proportion of total assets.

Since 2008, FED has started to implement QE policy until 2014. FED purchased large amount of U.S Treasury securities and mortgage backed securities from EQ1 to QE4. The U.S Treasury securities increased from 0.476$ trillion to 2.461$ trillion over the period between 2008 to 2014. The mortgage-backed securities increased from 0.908$ trillion in 2009 to 1.737$ trillion in 2014.

On January 2014, FED reduced the purchase of securities about 1 hundred dollars every month until October 2014. And the total assets began to represent upward tendency.

In summary, conducting of monetary policy has some differences compared to that in ECB and FED. Chinese government still has enough authorities to directly control economic development. Due to shortage of high liquidity financial market, it is difficult to influence the amount of money relying on open market operation. Although open market operation is not an effective monetary instrument in China, PBC is engaging in open market operation to implement monetary policy with the rapidly development of Chinese financial market. PBC has started to use open market operations as an instrument since 1996. In 2013, PBC's open market operations regular sales and redemption of government bonds were used every Tuesday.

2.2.3 Big four state owned commercial banks

In 2015, the total profit in top 1000 large banks was 992,437$ million, including 32.16% of Chinese banks, 14.2% of European banks and 22.56% of North American banks. There are most profitable banks in China due to the statistical data. Chinese big four stated owned commercial banks stand for the most powerful strength in mainland China. We identify the basic information, significant events of big four state owned commercial banks and compare them to other big banks in the world in this subchapter.

2.2.3.1 Introduction to big four state owned commercial banks

China has four of the top 10 largest banks in the world: Industrial & Commercial Bank of China (ICBC), China Construction Bank (CCB), Bank of China (BOC) and Agricultural Bank of China (ABC).

Industrial & Commercial Bank of China (ICBC), established in 1984, is the largest multinational bank in the world by total assets, over $3 trillion as of 2014. ICBC is the most profitable bank in the world with the net profit of $2763 billion in 2014. As of 2008, ICBC has 385,609 employees, increase by 7,512 of 2007, and provides high quality financial provides and services for 1.9 billion individual customers and 3.1 million corporate customers. It has nearly 17 thousand domestic and overseas branches, with established international branches in Luxembourg, South Africa, South Korea, the United States and Australia, covering a majority of middle and big sized Chinese cities and major international financial centers.

Agricultural Bank of China (ABC), first founded in 1951, is the first state owned commercial banks in New China. It has numerous branches throughout mainland China and in London, New York, Sydney and Tokyo. ABC has 320 million retail customers, 2.7 million corporate clients, and nearly 24,000 branches. As of 2015, ABC was ranked by Forbes as one of the top 10 largest and most valuable companies in the world.

Bank of China (BOC) was founded in 1912 by the Republican government to replace the Imperial Bank of China. It is the oldest bank in mainland China still in existence. In 2009, the bank was recognized as the second-largest loan provider in China.

In 2015, it was the fifth-largest bank in the world in terms of market capitalization of approximately $1.5 trillion. The BOC is considered the most international of all China's banks as it has branchs in every inhabited continent in the world. It operates in more than 20 countries including Canada, the United States and the United Kingdom.

China Construction Bank (CCB) is founded in 1954 to manage construction fund under the background of the first five-year plan in New China. CCB was ranked in 2015 as the fourth largest in the world in terms of market capitalization of nearly $2 trillion. It operates nearly 14,000 branches, with established international branches in Luxembourg, South Africa, South Korea, the United States and Australia.

2.2.3.2 Reform of big four state owned commercial banks

The four state owned commercial banks were first established as wholly state funded commercial banks. They made great contribution to economic development and society stability over the years. But they became serious about many problems in their development process. In 2003, the big four banks began the process of recognizing as joint stock companies.

Soundness financial system requires diversified subjects, but four wholly state funded commercial banks took about 70% market share. Other banks could not completive with the big four banks fairly, and some of them seek illegal competitive ways in order to own more market shares.

In terms of Basel agreement, the capital adequacy ratio should be at least 8%. In 2000, the average capital adequacy ratio of world's top 20 biggest bans was 11.52%, compared to that of lower than 8% in big four banks. The average NPL of world's top 20 biggest banks was 3.27%, but the NPL for big four banks was up to 20%. Undercapitalization of big four banks has weaken the ability of them to reduce loan loss and expand their business.

After entering the 1980s, the four wholly state funded commercial banks has replaced government to provide fund to state owned enterprises. According to some statistics, 80% of loans from the four wholly state owned commercial banks were contributed to state owned enterprises. At the end of 1996, the loans of state owned

enterprises provided by the big four banks were about 4743.47 billion yuan. The big four banks paid out heavy cost due to support the improvement of state owned enterprises.

In order to solve the serious problems of big four banks, China's Ministry of Finance issued 270 billion yuan of long term special treasury bond, and used the proceeds to enhance the capital of the big four banks in August 1998. Next, to ease the tax burden on big four banks, Chinese government lower the business tax by one percentage per year over a three-year period, from 8% in 2000 to 3% in 2013.

Although the assistance from government had some impact, it was not still enough. In 1999, Chinese government established four assets management companies (Huarong, Great Wall, Xinda and Orient), wholly owned by The Ministry of Finance. By July 2000, These assets management companies had largely completed purchasing from the big four NPLs with a total book value of 1.4 trillion yuan.

Central Huijin Investment, set up in 2003, injected capital to Bank of China (150$ hundred million), China Construction Bank (150$ hundred million), Industrial & Commercial Bank of China (150$ hundred million) and Agriculture Bank of China (190$ hundred million) by using foreign exchange reserves. From 2005 to 2010, the big four banks successively listed in Shanghai Stock Exchange and Hong Kong Stock Exchange.

Following the conservation of wholly state owned commercial bank into joint stock companies, the emphasis of reform aimed at their public listing shifted to attract strategic investors. The objectives were not only to enhance capital, but also to improve managerial and governance capabilities.

According to guidelines of China Banking Regulatory Commission (CBRC) issued in 2006, foreign investors should invest no more than two commercial banks at the same time and other rules. Tab 2.1 shows the major shareholders of big four banks.

Tab 2.1: Banks shareholder composition after entrance of strategic investors

Commercial banks	Strategic investors	Equity stake
CBC	Central Huijin Investment	71.13%
	China Construction Bank	10.65%
	Bank of America (US)	9%
	Temasek (Singapore)	5.10%
	Shanghai Baosteel	1.55%
	State Grid Corp. of China	1.55%
	China Yangtze Power	1.03%
BOC	Central Huijin Investment	79.90%
	RBS (UK)	9.61%
	Temasek (Singapore)	4.80%
	National Council for Social Security Fund	3.91%
	UBS (Switzerland)	1.55%
	Asian Development Bank	0.23%
ICBC	Ministry of Finance	43.28%
	Central Huijin Investment	43.28%
	Goldman Sachs (US)	5.75%
	National Council for Social Security Fund	5%
	Allianz (Germany)	2.25%
	American Express (US)	0.45%
ABC	Central Huijin Investment	40.41%
	Ministry of Finance	39.21%
	HKSCC Nominees Limited	9.03%
	National Council for Social Security Fund	3.02%
	China Securities Finance Corp	1.30%
	Others	7.03%

Source: http://www.nicmr.com/nicmr/english/report/repo/2009/2009win03.pdf.

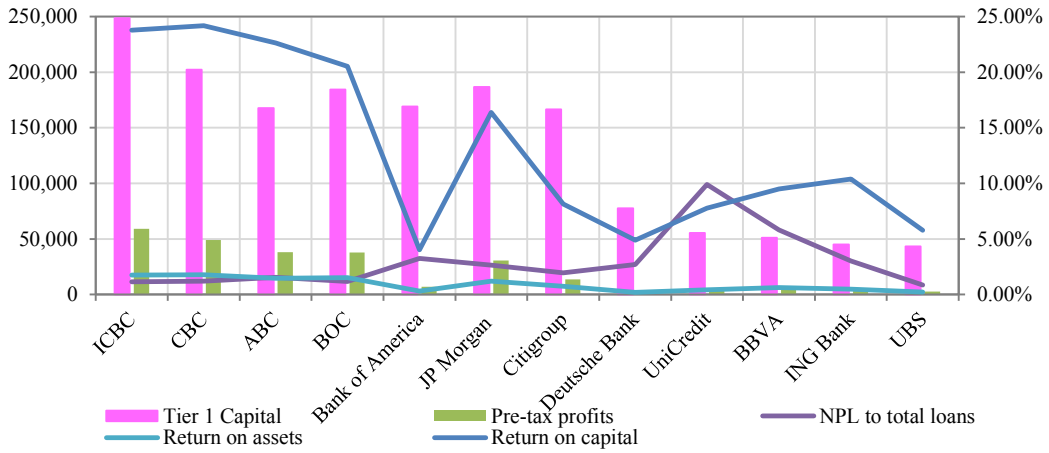
From the Tab 2.1, many foreign financial institutions have invested into the big four banks as the way to enter Chinese market, but Central Huijin Investment and Ministry of Finance are still the main shareholders.

2.2.3.3 Comparison of the big four banks to other large banks

Since 2008, the world's largest banks have continued to lose ground to Chinese rivals, and there were 10 Chinese commercial banks listed in world top 50 large banks

in terms of tier_1 capital. In 2014, the first five banks in terms of assets were ICBC (3,368,190$ million), CCB (2,736,416$ million), ABC (2,610,582$ million), JP Morgan (2,573,126$ million) and BOC (2,492,463$ million). We select another 3 American banks and 5 European banks and compare them to big four banks in figure 2.6.

Figure 2.6: 12 of top 50 largest banks in 2014 ($ Million)



Source: http://www.thebankerdatabase.com/

Overall the figure suggests that return on assets, return on capital and pre-tax profits of four Chinese banks were greatest among which of 12 banks in 2014. Maybe the reasons are Chinese so huge consumer market, and sufficient capital and policy support of Chinese government. For tier_1 capital, the first five banks were ICBC (248,608$ million), CCB (202,119$ million) JP Morgan (186,632$ million) and BOC (184,231$ million). ROA of ICBC, CCB, BOC, and JP Morgan ranged between 1% and 2%, comparing to which of not greater than 1% in other banks. The big four banks and JP Morgan had relatively better profitability compared to which of other 7 banks.

The United Bank of Switzerland (UBS) had the lowest NPL ratio of 0.85% in 2014. Adversely, NPL of UniCredit SpA in Italy was so large and it up to 9.9% in 2014. Because of serious non-preforming loan problems in Italy banking industry recently several years, UniCredit SpA, was monitored by European Central Bank.

2.2.4 Other banks in China

After years of reform and development, China banking system consists of diversified forms of banks: policy banks, joint stocks banks, other commercial banks, regulator, as well as state owned commercial banks

- **Bank of Communications**

To begin with, we should also notice that Bank of Communications (BOCOM) is one of the five state owned commercial banks in China. It provides corporate banking business, investment banking business, private banking business, treasury business, international and universal operation. As one of the oldest bank in China, BOCOM was first established in 1908. It is one of the note issuing banks in modern China. It was listed both on the Hong Kong and on the Shanghai Stock Exchanges in June 2005 and May 2007 respectively. Now, the largest shareholders are Ministry of Finance of China (26.53%), HKSCC Nominees Limited (20.12%) and The Hong Kong and Shanghai Banking Corporation (18.7%).

- **Policy banks**

The three wholly state funded policy banks are Agriculture Development Bank of China (ADBC), Export and Import Bank of China (EIBC) and China Development Bank (CDB), subordinated by The State Council. CDB and ADBC were chose as two of the world's 50 most safety banks in 2012.

Agriculture Development Bank of China (ADBC) is responsible to provide funds for the purchase of grain, cotton, agriculture-related enterprises, new countryside construction, agricultural development and rural infrastructure; and fund management services. From 2004 to 2014, ADBC provided aggregate grain, cotton and oil loans up to 3.7 trillion yuan, and total assets increased from 719 billion yuan to 2.5 trillion yuan. Meanwhile, NPL ratio declined from 18.8% to 0.17%.

Export and Import Bank of China (EIBC) is responsible to provide financial support to promote export of Chinese mechanical and electronic products, equipment, high and new technology products. EIBC also offers loans and support to foreign

governments. The bank has the same credit rating as China's sovereign rating, and its credit rating from Moody's is Aa3.

China Development Bank (CDB) devote itself to support infrastructure construction, basic industries, key industries, promote financial system reform, and create financial innovation and corporation. CDB has played an important role in supporting economic development since it was established. *It has financed a whole host of priority mega-projects, including the Three Gorges Dam, the Beijing-Kowloon railway, the Beijing Olympic Games Venues, the Shanghai World Expo, and the Beijing-Shanghai high-speed rail, to name just a few*[2].

- **Joint stock commercial banks**

Now, China has 12 middle and small sized joint stock commercial banks, most of them are controlled or owned by local government and state.

Among these banks, **China Merchants Bank (CMBC),** funded in 1987, is the first share-holding commercial bank wholly owned by corporate legal entities in China and the first listed company applying international accounting standards in China. **China CITIC Bank** is Chinese seventh largest lender in terms of total assets over 12000 hundred million Hong Kong dollar. It is a nationally comprehensive and internationally oriented commercial bank. The bank provides a range of services, including retail banking, private banking and corporate banking. **Shanghai Pudong Development Bank (SPDB)**, headquartered in Shanghai with the approval of People's Bank of China, is a joint-stock bank that was founded on August 28, 1992, beginning operations on January 9 1993 and making its initial public offering on the Shanghai Stock Exchange on November 10, 1999. It currently has RMB18.653 billion in registered capital.

The above-mentioned three joint stock banks, as well as **Hua Xia Bank, Industrial Bank** and **China Minsheng Bank (CMSB)** are the top six joint stock banks in China.

[2] https://www.idfc.org/Members/cdb.aspx

We should particular mention **China Minsheng Bank (CMSB)**, the first bank in China to be owned mostly by non-government enterprises. CMSB was built in 1996 and listed both in Shanghai Stock Exchange and in Hong Kong Stock Exchange. CMSB focus on servicing middle and small sized enterprises, including proving middle and long term loans, selling and purchasing government securities, financial guarantee and so on. In order to establish a diversified banking system, CBRC approved the application of three non-government banks in 2014, which stands for great improvement of Chinese banking reform oriented to market economy. In 2015, other two non-government banks were authorized by CBRC.

- **Other commercial banks**

Urban commercial banks, city commercial banks, Postal Saving Bank of China (PSBC) and foreign banks hold important positions in Chinese banking industry too.

City commercial banks are the result of reconstructing and consolidating urban credit cooperatives (UCCs) since the mid-1990s.They are special groups in China, which are the products of government eliminating regional financial risk. Due to geographical limitation, Chinese city commercial banks have the features of small size, for example, total assets of most of them are below 200 hundred million and total assets of 70% of them are below 100 hundred million. City commercial banks which have good performance often start their business in developed area, because of the high budget revenue in local government and large amount of small firms with high profit ratios.

Rural commercial banks in China are the local financial institutions invested by farmers, individual business, legal persons and other economic organizations. Main duties of them are serving farmers, middle and small sized firms and making contribution to rural economy.

Postal and Saving Bank of China (PSBC) was set up with an initial capital of 20 billion yuan in 2007 by the State Post Bureau. Today it has 1.5 billion yuan in deposits and the second largest number of branches, after the Agricultural Bank of China. It provides a range of services to rural and low income customers.

After Chinese government reducing the limitations on aboard investments in 2001, a large number of **foreign banks** have established their branches in China. Now, major foreign banks in China are National City Bank of New York, Standard Charted Bank, Bank of East Asia, Bank of American, HSBC and Development Bank of Singapore.

In conclusion, although big four state owned commercial banks still have great influence on Chinese banking system, the total assets of joint stock commercial banks, city and rural commercial banks rose gradually from 2006 onwards. On account of shortage of branches and high supervision requirement, total assets and market share of foreign banks represented downward tendency in recent years. The following Tab shows the assets share of different types of banks in banking industry.

Tab 2.2: Assets shares of different types of banks

	State owned commercial banks	Joint stock banks	City commercial banks	Rural commercial banks	Foreign banks
2006	55%	12%	5.9%	10%	2.11%
2007	53.25%	13.78%	6.35%	10.64%	2.38%
2008	51.01%	14.12%	6.60%	11.44%	2.26%
2009	49.20%	15.60%	7.20%	14.90%	2.70%
2010	47.30%	16.20%	7.70%	15.20%	2.83%
2012	44.90%	17.60%	9.34%	15.60%	1.84%
2013	43.30%	17.80%	10.13%	16.20%	1.70%
2014	41.20%	18.20%	10.59%	16.50%	1.63%

Source: Annual reports of China Banking Regulatory Commission

2.2.5 Private banking in China

In 2007, Bank of China became the first bank to provide private banking service for the rich with property more than 10$ million in mainland China. After years of rapid development, by 2014, there were 9 joint stock commercial banks, some city commercial banks, such as Beijing Bank; as well as 5 state owned commercial banks, providing private banking services.

There is board development space for private banking business in China. By the end of 2014, value of private banking clients' assets managed by major Chinese

commercial banks was nearly 5 trillion yuan, which only up to 3% of total Chinese rich people's money.

Recently, revenues of private banks come from assets management, agent services and consulting services, but only few banks gained profits from private banking business. Comparing to foreign banks which provide private banking business, Chinese banks have advantage of relatively sufficient number of customers, and weakness of lacking in experience and global market resources.

Due to the fact that some banks did not provide their relevant private banking service information, we selected some of them to analyze private banking in China.

Tab 2.3: Relevant data of selected private banks in 2014

	Holding assets of customers (Billion)	Assets increase rate	Number of customers (Ten thousand)	Customers increase rate	Minimun entry assets requirement (Ten thousand RMB)
China Merchants Bank (CMBC)	752.6	31.70%	3.28	28.60%	1000
Minsheng Bank (CMSB)	230.4	20.03%	1.43	10.48%	800
China CITIC Bank	201.6	25%	1.36	18.30%	600
ShangHai Pudong Development Bank (SPDB)	220	57.10%	1.2	69.70%	800
China Everbright Bank (CEB)	168.5	-	1.83	5.78%	600
Guangfa Bank (GDB)	-	-	-	-	600
Industrial Bank	220	10%	1.8	20%	800
Ping An Bank	-	-	-	-	600
ICBC	735.7	35.90%	4.31	37.50%	800
ABC	640	26.70%	5.7	26.70%	600
BOC	720	26.30%	7.4	23.30%	800
CCB	-	18.12%	-	14.18%	1000
Bank of Communications (BOCOM)	291	24.39%	-	-	200$
Beijing Bank	-	-	-	-	600

Source: Annual report.

The table shows that CMBC, ICBC, ABC and BOC held customers' assets over 400 billion. CMBC was ranked the best private bank for the holding assets of 752.6 billion yuan and had the minimum entry assets requirement of 10 million yuan. ICBC, as the most profitable bank, was second only to the CMBC in terms of holding customers' assets and was third in terms of number of customers.

CEB is the last bank to start private banking business among these banks and held the assets of 168.5 billion yuan. We could regard SPDB as a private bank with the greatest potential because of its assets increase rate (57.10%) and customers increase rate (69.7%). Beijing Bank is the Chinese first city commercial bank to operate private banking business, with the minimum entry assets requirement of 6 million yuan. Bank of China (BOC) has the largest number of customers, because it is the first bank to operate private banking business.

Annual report of China Construction Bank did not show the value of holding customers' assets and number of customers, but the CCB made constant progress in private banking business, with an increase of 18.12% in the amount of holding customers' assets and an increase of 14.18% in customers' increase rate.

Although there is shortage of public data, it is certain that BOCOM has the richest clients among which of other private banks, and the average clients' assets was 85.4 million yuan according to a report in 2012.

In summary, China Merchants Bank is the first in terms of wealth management ability and value of holding customers' assets. As the Chinese largest bank, ICBC only ranks the second in terms of private banking business. Five state owned commercial banks still play more important roles than other commercial banks in Chinese private banking business.

3 Description of the Evaluation Methodology of Banks

Financial ratio analysis is a significant component of evaluation methodology in banking industry. It involves examining historical data to gain current and future financial health of a bank. By comparing industry standards and bank's past results, analysts can identify the weakness and strengths of a bank and then give bank's managers the information they need to make wise decisions. A bank's overall financial health can be assessed by examining the following major indicators: profitability ratios, credit risk ratios, liquidity ratios, market risk ratios and so on.

3.1 Profitability ratios

Profitability ratios measure bank's ability to generate profit as compared to expenses and other relevant items incurred during a specific period of time. For banks, having higher values of these ratios or the same ratios as which of previous years means that the bank is doing well. Among the most important ratios that measure profitability used today are introduced in the following.

3.1.1 Return on equity

Return on equity (ROE) measures the amount of net income returned as the percentage of shareholders' equity. It evaluated the efficiency of a company at generating profit from each unit of equity. ROEs 15-20% are generally considered good.

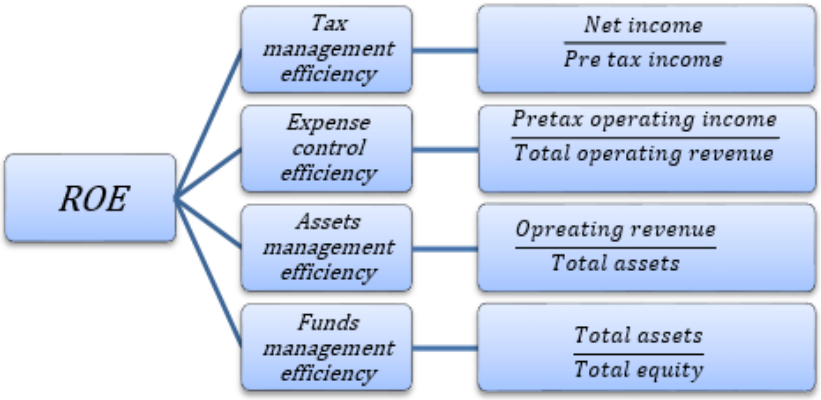
$$ROE = \frac{Net\ profit}{Total\ equity\ capital}. \tag{3.1}$$

Compared to ROE, return on average equity more accurately describes profitability of banks, especially the value of shareholders' equity has changed considerably during an operating year. If the shareholders' equity does not change or changed slightly, ROE and ROAE should be similar. we can derive average return on equity (ROAE) as follows:

$$ROAE = \frac{EAT}{(Equity_t + Equity_{t+1})/2}. \tag{3.2}$$

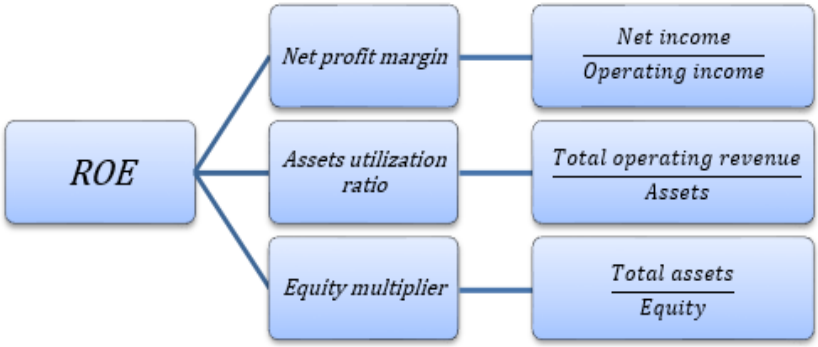
We note that return on equity be separated as tax management efficiency (which measures what percentage of income is lost to taxation), expense control efficiency (firms who focus on cost control will have high expense control efficiency ratio), assets management efficiency (this ratio tells us how efficiency and effectively a company is using its assets in the generation of revenues) and funds management efficiency (this ratio tells us how efficiency and effectively a company is using its equity to increase its assets).

Figure 3.1: ROE decomposition



ROE ratio also should be explained as product of net profit margin, assets utilization ratio and equity multiplier. Net profit margin is the percentage of net income remaining after all operating expenses, interest, tax have been deducted from total revenue. Assets utilization ratio measures company's ability to make the best use of its assets to generate revenue.

Figure 3.2: ROE decomposition



3.1.2 Return on assets

ROA is a useful measure of how well a bank manager is doing on the job because it indicates how well a bank's assets are being used to generate profits. In other words, it measures how efficiency a bank can manage its assets to produce profits during a period. Banks are highly leveraged, so 1% of ROA indicates huge profits. The return on assets was represented as:

$$ROA = \frac{EAT\ or\ EBT}{Total\ assets}. \tag{3.3}$$

As opposed to ROA, ROAA equals to net profit divided by total average assets. Total average assets equal the average of total assets at the beginning of period plus total assets at the end of period. Both the change of income and assets depends on the selected beginning and ending days. If assets changed little during the operating period, ROA and ROAA would be very similar. If there were significant changes in assets and income over operating period, ROAA would be better to indicate performance of banks. A lower ROAA also reflects higher assets intensity of banks. A more assets intensive bank requires large amount of money to generate profit. The ROAA was showed as:

$$ROAA = \frac{EAT}{(Assets_t + Assets_{t+1})/2}. \tag{3.4}$$

3.1.3 Net interest margin

The net interest margin measures the difference between interest paid and by banks and interest received, relative to amount of interest earning assets. The negative net interest margin means banks cannot make optimal decisions to gain profit. This ratio is an important indicator to track the investing and lending activities of banks over a specific time.

One definition of earning assets are any assets that generate income without additional investment of the owners, this includes things like interest bearing assets, securities such as stocks and bonds, and anything that pay dividend. The other definition of earning assets includes assets such as real estate that can earn money but require some

expenditures, such as additional pays for insurance taxes, maintenance and improvement.

We can calculate the net interest margin as the following equation:

$$NIM = \frac{Net\ interest\ income}{Average\ interest\ earning\ assets}. \quad (3.5)$$

3.1.4 Net non-interest margin

Net non-interest margin shows the relationship between banks' services income (deposit service charge, insufficient funds fee, annual fee and so on) and amount of earning assets. For banks, fee income typically makes up for majority of non-interest income. Typically, the net noninterest margin is negative: noninterest costs generally outstrip fee income, though fee income has been rising rapidly in recent years as a percentage of all revenues. The equation of net non-interest margin is:

$$Net\ non\ interst\ margin = \frac{Net\ non\ interest\ income}{Total\ earning\ ssets}. \quad (3.6)$$

3.1.5 Earnings per share

Earnings per share represents the net profit of banks, net of preferred stock dividends, was allocated to common stock shareholders. It is better to use a weighted average number of shares outstanding due to the continuously changed number of shareholders. This ratio is often used to evaluate banks business preference by investors. The higher of this ratio, the stronger capability of banks to generate more profit. It should be noted that earnings per share does not reflect the risk of stock issued by the banks. The earnings per share can be calculated as:

$$Earnings\ per\ share\ of\ stock\ (EPS) = \frac{Net\ income}{Common\ equity\ shares\ outstanding}. \quad (3.7)$$

3.1.6 Earnings spread

Earnings spread refers to the difference between borrowing and lending rate of financial institutions. The earnings spread is like a profit margin, the greater the spread,

the more profitable the financial situation is likely to be. The spread also measures the effectiveness of financial situations' intensity of competition in financial market. Greater competition tends to squeeze the difference between average assets yields and average liability costs. If other factors are held constant, the spread will decrease as competition increases, forcing management to try to find other ways to make up for an eroding earnings spread. The earnings spread is calculated as follows:

$$Earnings\ spread = \frac{Total\ interest\ income}{Total\ earning\ assets} - \frac{Total\ interest\ expense}{Total\ interest-bearing\ liabilities}. \quad (3.8)$$

3.1.7 Cost to income ratio

Apparently, cost to income ratio is similar to operating profit margin and equals to operating cost divided by operating income. This ratio represents efficiency of banks in minimizing cost while increasing profits. The lower this ratio, the more efficient the bank is running. If the ratio rises from one period to the next, which means the cost are rising at a higher rate than income, so the banks should focus on attracting more business. The cost to income ratio is this one:

$$Cost\ to\ income\ ratio = \frac{Operating\ cost}{Operating\ income}. \quad (3.9)$$

3.2 Credit risk ratio

Credit risk is the risk associated with losses stemming from the failure of a borrower to make timely and full payments or principal. The following are most widely used ratio indicators of credit risk.

3.2.1 Non-performing loan ratio

A non-performing loan is a loan that is in default or close to being in default. Many loans become non-performing after being in default for 90 days. NPL ratio measures the rate at which a bank's loans are not repaid. If a company have high NPL ratio, which means the company have cash flow problem, because there are much loans which are not repaid. The non-performing loan ratio is showed as:

$$NPL_R = \frac{NPL}{Loans}. \quad (3.10)$$

3.2.2 Provisioning rate

Provisioning rate is the percentage of provisions to total loans, high provisioning rate means bank prepares much money to cover the default loss, which was estimated as the following equation:

$$Provisioning\ rate = \frac{Provisions}{Loans}. \quad (3.11)$$

3.2.3 Charge off ratio

The charge-off is the amount of debt that a company believes it will never collect. Bad debt or poor credit quality loans are regularly charged off as bad debt. Charge off ratio measures the company expects that percentage of its debt will never be recovered for a certain period. We could find the charge off ratio as:

$$Charge\ off\ ratio = \frac{Charge\ off}{Loans}. \quad (3.12)$$

3.2.4 Coverage ratio

Coverage ratio is the measure of a company's ability to meet its financial obligations. In broad terms, the higher the coverage ratio, the better the ability of the enterprise to fulfill its obligations to its lenders. Coverage can be defined as the percentage of LLA to NPL. The formula of coverage ratio is:

$$Coverage\ ratio = \frac{LLA}{NPL}. \quad (3.13)$$

3.2.5 Loan loss allowance ratio

Loan loss allowance ratio measures how many percentage of allowance for loan loss to total loans. Loan loss allowance is an items of balance sheet, when borrower do not repaid loans to banks, the bank will make a provision to cover the loss. The loan loss allowance ratio is expressed as:

$$LLA_R = \frac{LLA}{Loans}. \quad (3.14)$$

3.3 Liquidity ratio

Financial service managers are also concerned about the danger of not having sufficient cash and borrowing capacity to meet customer withdrawals, loan demand, and other cash needs. Faced with liquidity risk a financial institution may be forced to borrow emergency funds at excessive cost to cover its immediate cash needs.

For banks, the key ratio used to examine liquidity is the loan to deposit ratio. Just as its name implies, loan to debt ratio is measured as the loan divided by debt. Loan to debt ratio is used to calculate banks' ability to cover withdrawals made by its customers. *If the ratio is too high, it means that banks might not have enough liquidity to cover any unforeseen fund requirements; if the ratio is too low, banks may not be earning as much as they could be*[3]. The ratio should be maximal 80%-90%. If the ratio is between 70%-80%, which means banks still have ability to write new loans. This ratio is calculated as:

$$Loan\ to\ deposit = \frac{Loan}{Deposit}. \quad (3.18)$$

3.4 Market risk ratio

Market risk is the risk of loss to banks resulting from change in market price due to changes in interest rate., foreign exchange rate, equity and commodity price. Market risk have two components: general market risk and specific market risk. General market risk is the risk of broad market movement that unrelated to any specific securities. Specific market risk affects a small number of assets and is very specific to small group of companies. For banks, the most often used indicators of market risk are interest rate risk.

[3] http://www.investopedia.com/terms/l/loan-to-deposit-ratio.asp

3.4.1 Interest rate risk

The impact of changing interest rates on financial institution's margin of profit is called interest rate risk. Interest risk is calculated as interest sensitive assets divided by interest sensitivity liabilities.

When interest sensitivity assets exceed interest sensitivity liabilities in a particular rage, banks are vulnerable to losses from falling interest rate. In contrast, when interest sensitivity liabilities exceed interest sensitivity assets, losses are likely to incurred if market interest rate rise. We find the expression of interest risk ratio as:

$$Interest\ rate\ risk = \frac{Interest\ sensitivity\ assets}{Interest\ sensitivity\ liabilities}. \quad (3.19)$$

Interest sensitivity assets are all assets which are sensitive to interest. Short term loan is a kind of interest sensitive assets, short term loans include customers' loans, variables rate loans and security and short term securities issued by government. Interest sensitive liabilities include money market deposit, short term savings account, borrowing from money market and federal funds

3.5 Efficiency and employee productivity ratio

In order to maximize the profit and the effect of shareholders' investment in banks, managers recognized the necessary of great efficiency in their operation process. This not only means reducing operating expenses but also means increasing the productivity of their employees through the use of equipment and improved employee training. The employee productivity ratios are usually measured as the amount of units' products that an employee handles in a defined time.

According to different numerators, the formulas of employee productivity ratios are listed in the following:

$$Employee\ productivity\ ratio_1 = \frac{Net\ operating\ income}{Number\ of\ full\ time\ equvalent\ employee}. \quad (3.20)$$

$$Employee\ productivity\ ratio_2 = \frac{Total\ assets}{Number\ of\ full\ time\ eqvalent\ employee}. \quad (3.21)$$

$$Employee\ ratio = \frac{Personal\ cost\ or\ salary}{Number\ of\ full\ time\ equvalent\ employee}. \quad (3.22)$$

Operating efficiency ratio is another indicator to evaluate efficiency of bank's management by comparing operating expense to operating revenue. A rise in the value of operating efficiency ratio often indicates the expense control problem, perhaps resulting from staff costs. In terms of a formula, the operating efficiency ratio may be found from:

$$Operating\ efficiency\ ratio = \frac{Total\ operating\ expense}{Total\ operating\ revenue}. \quad (3.23)$$

3.6 Risk index

Risk index, known as RI, is the measure of how much a bank's accounting earnings can decline until it has the negative book value. The variability of ROA provides comprehensive measure of overall risk of banks. The standard deviation of ROA is a good measure of variability of ROA. The higher value of this ratio, the safer of the bank. Combing ROA and σ_{ROA}, the empirical form of RI is:

$$RI = \frac{[E(ROA)+CAR]}{S_{ROA}}. \quad (3.24)$$

Where: the $E(ROA)$ is the expected return on assets. CAP measures the ratio of equity to assets. S_{ROA} means the standard deviation of ROA.

3.7 Probability of financial insolvency

Insolvency refers to the situation that organizations can no longer meet their financial obligations when their debt become due. Insolvency can result in insolvency proceedings, in which insolvent entries' assets may be liquidated to pay off outstanding debts. The probability of financial insolvency, known as *P(BV)*, measures the possibility of banks' failure to face their financial obligations. We compute the ratio as the following equation:

$$P(BV) = \frac{1}{2 \cdot RI^2}. \quad (3.25)$$

3.8 Capital adequacy ratio

Capital adequacy ratio measures banks' capital in relation to its risk weighted assets. Tier 1 capital and tier 2 capital are mean components of capital to measure this ratio. We calculate the capital adequacy ratio as:

$$Capital\ adequancy\ ratio = \frac{Tier\ 1\ capital + tier\ 2\ capital}{RWA}. \quad (3.26)$$

Tier 1 capital is core capital, which includes common stock, surplus, retained earnings, noncumulative preferred stocks, ministry interest in consolidated subsidies and some identifiable intangible assets.

Tier 2 capital consists LLA, subordinated debt, mandatory convertible debt, cumulative preferred stock, equity note and other long term capital instruments combining both debt and equity features.

$$Risk\ weight\ assets = \sum_i RV_i \cdot EAD_i. \quad (3.27)$$

Risk-weighted asset (also referred to as RWA) is a bank's assets or off-balance-sheet exposures, weighted according to risk. A bank must have a capital adequacy ratio greater than 8%.

3.9 Core Tier 1 capital ratio

This ratio measures a bank's financial strength by using their own capital. Basel I stipulated that for a bank to qualify as adequately capitalized it must have Core tier 1 capital ratio of at least 4%, compared to that of 4.5% stipulated by Basel II. The formula is follow as:

$$Core\ tier\ 1\ capital\ ratio = \frac{Tier_1\ capital}{RWA}. \quad (3.28)$$

3.10 Required ratios of Basel III

Basel III, announced by the number of Basel Committee on Banking Supervision in 2010, is responsible to the deficiency in financial regulation revealed by financial crisis of 2007-2008. Unlike Basel I and Basel II, Basel III is intended to strengthen bank capital requirement by increasing bank liquidity and decreasing leverage. It introduced a capital conservation buffer of 2.5%, as protecting against economic and financial stress, and required a higher minimum level of Core tier 1 capital ratio of 4.5%, comparing that of 4% in Basel I and 2% in Basel. In addition, two liquidity ratios (net stable funding ratio and liquidity coverage ratio) and a leverage ratio are implemented by banks to assess risk.

3.10.1 Net stable funding ratio

Net stable funding ratio is defined as the amount of available amount of stable funding relative to required amount of stable funding, which should be equal to at least 100%. This ratio focus on calculating the proportion of long term assets which are funded by long term stable funding, and encourages banks to increase the sources of long term stable funding by structural adjustment. The net stable funding ratio is showed in the following equation:

$$NSFR = \frac{Available\ amount\ of\ stable\ funding}{Required\ amount\ of\ stable\ funding} \geq 100\%. \qquad (3.29)$$

Stable funding includes customer deposit, long term wholesale funding, and equity, and excludes short term wholesale funding. Available stable funding is defined as the portion of capital and liabilities expected to be reliable one year. Required stable funding is defined as the amount of stable funding required by supervisors based on value of balance sheet assets held multiplied by RSF factors assigned to a particular assets type plus an equivalent computation for off-balance sheet activities.

3.10.2 Liquidity coverage ratio

Liquidity coverage ratio is designed to ensure banks have enough high quality liquidity assets to ride out short term liquidity disruptions. The LCR was introduced in 2015 with the minimum requirement of 60%, but it will raise in equal annual step to reach 100% in 2019. The liquidity coverage is represented as:

$$LCR = \frac{High\ quality\ liquidity\ assets}{Total\ net\ cash\ out\ flows\ over\ 30-day\ stress\ period}. \tag{3.30}$$

High quality liquidity assets regulated by Basel accord should comprise: at least 60% 'Level 1' assets - essentially cash, central bank reserves and sovereign debt qualifying for a 0% risk weight under the Basel II standardized approach for credit risk; and, no more than 40% 'Level 2' assets – sovereign debt qualifying for a 20% risk weight under the Basel II standardized approach for credit risk and corporate bonds and covered bonds of at least AA rating.

3.10.3 Leverage ratio

Leverage ratio has been introduced as non-risk based approach to measure leverage, and are calculated as core tier_1 capital divided by total exposure. Banks are required to maintain the leverage ratio in excess of 3%. The leverage ratio is expressed as:

$$Leverage\ ratio = \frac{Tier\ 1\ capital}{Total\ exposure} \geq 3\%. \tag{3.31}$$

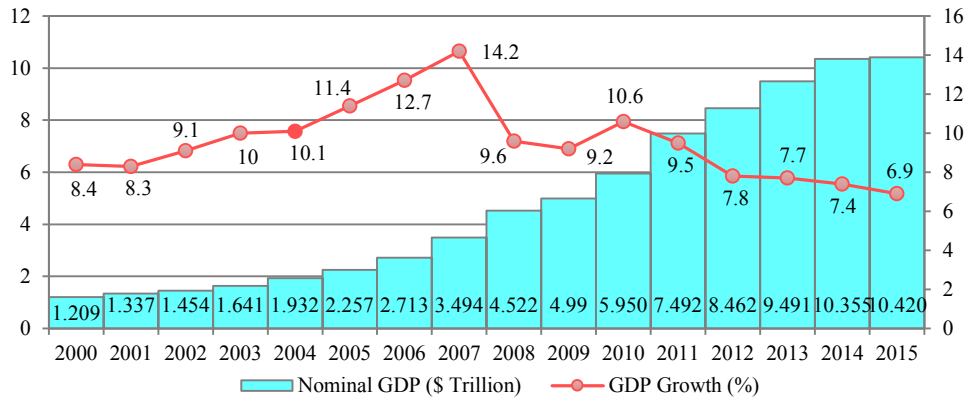
Total exposure encompasses the exposure value of both on-balance sheet assets and off-balance sheet assets.

4 Comparison of State Banks to Other Banks in China

This chapter investigates the comparison of big four state owned commercial banks to other 6 listed banks applying indicators mentioned in chapter 3. In practical, section 4.1 focus on profitability ratios; section 4.2 on the credit risk ratios; section 4.3 on loan to deposit ratio. Risk index and probability of insolvency are referred in section 4.4. Lastly, capital adequacy ratios illustrate capital quality of selected banks.

To begin with, we briefly introduce basic information of Chinese banking industry and macroeconomic environment, which are showed in the following figures:

Figure 4.1: Chinese GDP



Source: The World Bank

The GDP has undergone a period of rapid development, and now it going to slow down. In 2015, China's annual GDP growth rate was 6.9%, slightly shy of its target of 7% and the lowest for last 15 years. The economy slowdown was thought to be inevitable as it transactions toward services led economy. The manufacture industry growth slowed to 6% in 2015 from 7.3% in 2014. The services sector expanded by 8.3%, up from 7.8% in 2014.

In 2015, to counter the slowing growth, the policy maker has taken prudent monetary policy, including interest rate and reserve requirement ratio cut from central bank.

Along with the GDP growth, Chinese banking industry achieved prosperity in 2011, then it started to experience a slowdown. The related data of Chinese banking industry was showed as follows:

Tab 4.1: Information of Chinese banking industry (RMB Trillion)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Deposit	34.8	40.1	47.8	61.2	73.3	82.7	94.3	107.1	117.4	123.8
Loan	23.8	27.8	32	42.6	50.9	58.2	125	141.2	160	184.1
Net profit	0.34	0.447	0.583	0.668	0.899	1.25	1.51	1.74	1.93	1.974
Net profit growth rate	-	32.25%	30.43%	14.58%	34.58%	39.30%	20.70%	15.40%	10.50%	2.30%
Total assets	43.6	52.6	62.4	78.8	95.3	113.3	133.6	151.4	172.3	199.3
NPL of commercial banks	1.25	1.3	0.56	0.497	0.434	0.428	0.493	0.592	0.843	1.27

Source: Annual report of CBRC

China became serious about its NPL in banking sector in response to Asian financial crisis between 1997-1998. At the time, PBC estimated that state owned banks had NPLs about 2.2898RMB trillion, which accounted for 25.37% of total volume of loan. In 1999, four assets management companies (AMC) were established with the only shareholder of The Ministry of Finance, and they stripped out 1.4RMB trillion bad assets of big four state owned banks by central bank refinancing operations, issuing financing bonds to big four state owned commercial banks and China Development Bank. Government issued an executive order that AMC must finish to dispose the NPLs resulting from business cycle at the end of 2006. By 2006, four assets management companies had dispose 1.21 RMB trillion NPLs. With the help of Central Huijin Investment, CCB was listed in 2005, both BOC and ICBC were listed in 2006.

In 2007, NPL_R was 6.2%, declined by 0.93% compared to that of previous year. But the NPLs were increased by 0.5 RMB trillion, due to the increase of NPLs from ABC. At that year, with the drop of NPLs and NPL_R from other banks, NPLs of ABC were 0.7272 RMB trillion, which accounted for 57% of NPLs in banking industry and raised by 840 RMB hundred million. The huge NPLs in ABC were mostly contributed by bad loans of agriculture, forestry, animal husbandry and fishery.

In 2008, AMC stripped 0.8152 RMB trillion NPLs of ABC and The State Council approved the share reform plan of ABC. The NPLs were rapidly fall by 0.706 RMB trillion.

Overall, Chinese banking industry reached its highest level from 2008 to 2011, with the declining NPLs, fast developing net profit, and the rapid growth of the size of deposit and loan. From 2006 to 2011, the net profit growth rate remained above 30% except for the 14.58% in 2009. Net profit of banking industry made up 61.2% of total net profit in financial industry. Under the marketization of interest rate and economy transition, this situation is unlikely to last.

From 2014 to 2015, the growth rate of deposit and net profit showed downward trend. The growth rate of loan has continued to decline since 2012, which got the lowest point in 2014, but began to raise in 2015.

Firstly, as the strong cyclical industry, banking industry was strongly influenced by economic condition. During the transformation period, banks are willing to provide loans to high credit rating large corporations instead of small new entry firms. While the large corporations may not need extra capital due to excessive capacity. The banking industry faced huge operational pressure. In 2015, banks tried to increase loan by financial product innovation. The volume of loan contributed by financial product was 23.5RMB trillion, which was up by 56.46% compared to that of 2014.

Secondly, the rapid development of internet finance brought great pressure to traditional banking industry. More and more customers preferred to transact through internet instead of banks. Lastly, high coverage ratio eroded part of profit. Net profit growth rate of five state owned banks was below 1% in the first half of 2015. In the first quarter of 2016, there were negative growth of net profits for some banks. The big four state owned banks announced that their target of profit growth rate was negative 8%. With the sustained downward trend of net profit, regulatory authority considered to lower the coverage ratio of 120%.

We start by concentrating on representing the basic financial information of selected five state owned commercial banks, which are Industrial & Commercial Bank

of China (ICBC), Agricultural Bank of China (ABC), Bank of China (BOC), Construction Bank of China (CCB) and Bank of Communications (BOCOM); and five joint stock commercial banks, including China Merchants Bank (CMBC), China Minsheng Bank (CMSB), China CITIC Bank (CITIC), Shanghai Pudong Development Bank (SPDB) and Guangfa Bank (GDB). We see total assets and net profit of these banks in Tab 4.2:

Tab 4.2: Financial information of selected banks (Million RMB)

	Assets			Net profit		
	2012	2013	2014	2012	2013	2014
ICBC	17 542 217	18 917 752	20 609 953	238 691	262 965	276 286
ABC	13 244 342	14 562 102	15 219 013	145 131	166 211	179 510
BOC	12 680 615	13 874 299	15 251 382	145 746	163 741	177 198
CCB	13 972 828	153 63 210	16 744 130	193 602	215 122	228 247
BOCOM	5 273 379	5 960 937	6 268 299	58 369	62 295	65 850
CMBC	3 408 219	4 016 399	4 731 829	45 268	51 743	55 911
CMSB	3 212 001	3 226 210	4 015 136	37 563	42 278	45 546
CITIC	2 959 939	3 641 193	4 138 815	31 385	39 717	41 454
SPDB	3 145 707	3 680 125	4 195 924	34 186	40 922	47 026
GDB	1 168 150	1 469 850	1 648 056	11 220	11 583	12 037

Source: Annual report

We already introduced nine of ten selected banks in chapter 2. It must be pointed out that GDB ranked fifteenth in terms of total assets among Chinese banks in 2014. Citigroup, China Life Insurance Company, State Grid Yingda International Holding Group and China CITIC are the four biggest shareholders and each of them have 20% of bank's equity. It is one of the Chinese banks with the high proportion of shares controlled by foreign investors.

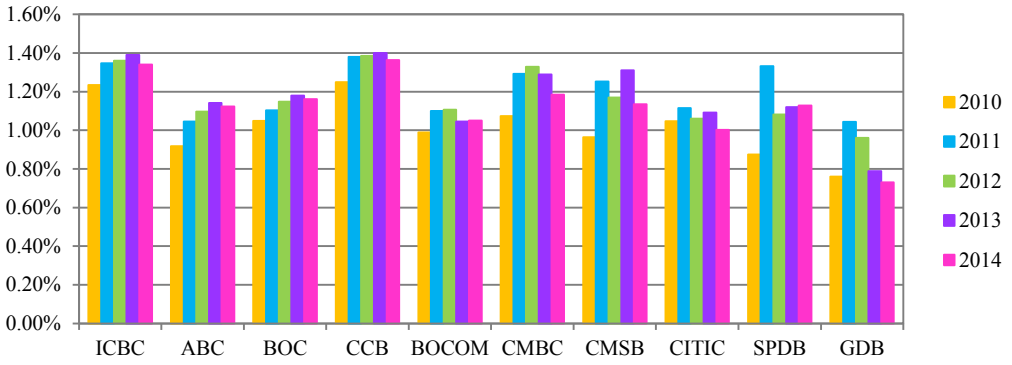
4.1 Profitability ratios of selected banks

This subchapter, we use return on assets, return on equity, return on average equity, earnings spread, net interest margin and net non-interest margin to measure selected 10 banks' ability to generate profit from their operations. The results of profitability ratios and relevant data are presented from figure 4.2 to figure 4.11.

4.1.1 ROA of selected banks

Using formula (3.3), we summarize ROA of selected banks in the following figure:

Figure 4.2: ROA of selected banks from 2010 to 2014



Over the figure suggests that big four state owned banks have stronger ability to convert assets into earnings than that of other banks. For a long time, Chinese government has controlled banking system. Central Huijin Investment, a major shareholder of big four state owned banks, stands for the government to support the big four state owned banks and requires them to fulfill obligations of servicing real economy. In 2015, ABC provided as much as 182 RMB hundred million loan to support farmland irrigation and water conservancy. Since the second half of 2014, CCB has supported totally 629 national key large scale construction projects. State owned commercial banks hold a monopoly in banking industry and the big four state owned banks accounted for 73% market share in 2014. As the systemically importance banks, the implicit government guarantee is a significant reason of high profits in big four banks.

What is noteworthy is that ROA of almost all of these banks decreased from 2013 to 2014, except for SPDB and BOCOM. Because BOCOM and SPDB paid more attention on increasing earning assets, reducing deposit cost and developing their E banking services. The decreased net profit growth rate, which we mentioned previously, was the main driver of the drop of ROA from 2013 to 2014.

ROA of selected banks reached the zenith of 1.4% from CCB in 2013. The steady growth of net profit was mainly due to the increase of interest earning assets. The bank

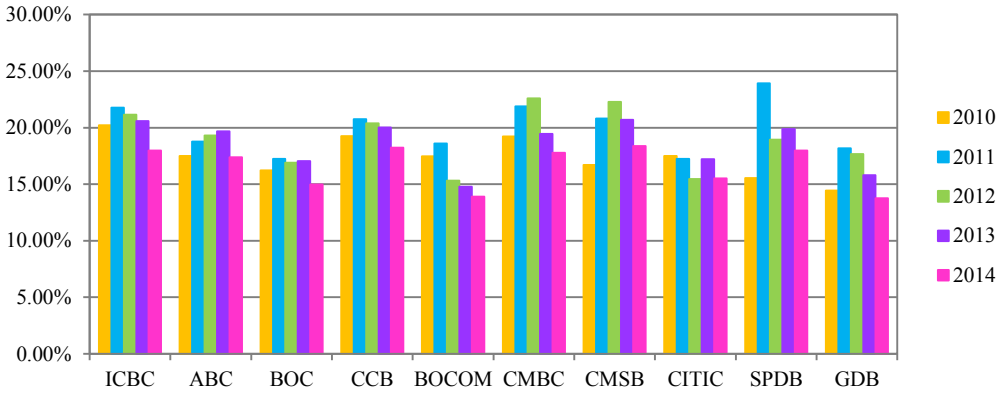
also further improved its cost management and optimized its expenses structure, resulting in a significant decrease in growth rate of operating expenses.

CMSB kept the ROA of 1.25% in 2011, a rapid increase of 0.29%. Sharply increased net profit was derived from optimized income structure and improved operating efficiency. The raise of interest earning assets made the increase in the net interest income by 85.21 RMB hundred million. The net commission and fee income accounted for 18.33% in 2011, a raise of 3.2%. Wealth management service, consulting service and credit card service made great contribution to the raise of net commission and fee income in 2011. ROA of SPDB reached the top of 1.33% in 2011. From 2010 to 2011, the bank steadily expended the scale of deposits and loans, immediate business income increased. Efficient cost control was the main driver of earning's growth. There was dramatically growth of ROA in GDB from 2010 to 2011. The GDB greatly expanded personal banking and financial market business, provided support to branches in high potential regions, and optimized business and income structure, all of which contributed to rapid growth of profit.

4.1.2 ROE of selected banks

Figure 4.3 shows the estimation of ROE during five years, applying formula (3.1).

Figure 4.3: ROE of selected banks from 2010 to 2014 (%)



The figure illustrates that all the banks have strong ability to generate profit from their capital. It is apparent from the figure that ROE of all banks declined from 2013 to

2014, except for ABC. Low profit growth rate, which we have identified in subsection 4.1.1, was the main reason that caused the decrease of ROE Facing unfavorable economic situation, in 2014, ABC achieved the net profit of 17.9510RMB trillion, representing an increase of 1.3299RMB trillion or 8% over the previous year. This was primary due to the increase in net interest income and decrease in cost to income ratio.

ROE of BOCOM reached the zenith of 18.6% in 2011, then fall markedly from 2011 to 2014. In 2011, the good financial situation was mainly due to effective control of unseasonal cost, tougher budget control and breakthrough of oversea branches. London, San Francisco and Australia branches were established on November, 2011.

ROE of selected banks ranged between 13.76% and 22.53% over the five years, which reached the peak of 22.53% from SPDB in 2013 and the bottom level of 13.76% from GDB in 2014.

For SPDB in 2013, the net profit reached to 4.0922RMB trillion, up by 0.6736RMB trillion. The main driver of earning growth was the steady expansion of the earning assets, the increase in intermediate business income and the efficient control of cost. In 2014, shareholders' equity of GDB increased rapidly as the result of raising in capital reserve.

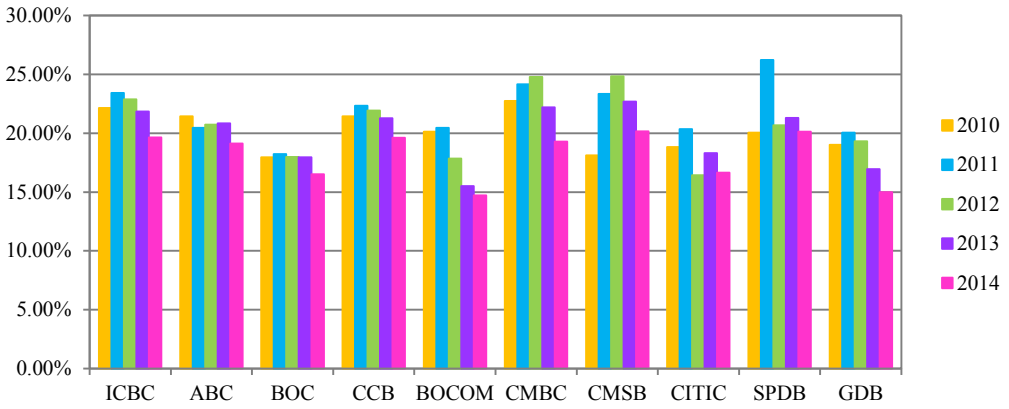
For CMBC, return on equity raised to 22.58% in 2012 from 19.23% in 2010, then plunged to 19.46% in 2013 and continually declined to 17.75% in 2014. In 2012, net profit of CMBC was 4.5268RMB trillion with the increase of 75.7%, which was mainly contributed by wholesale banking business.

From 2010 to 2012, ROE of CMSB showed the same tendency as which of CMBC. In 2012, with the tightened cost control and elevated operational efficiency, the net profit of CMSB was 3.7563RMB trillion, representing an increase of 1.9982RMB trillion or 113.7% in 2010.

4.1.3 ROAE of selected banks

By using formula (3.2), we computed the ROAE of selected banks in the following figure:

Figure 4.4: ROAE of selected banks



Comparing figure 4.4 to figure 4.3, ROAE of selected banks has the same tendency as ROE. But there were small changes of absolute value between ROE and ROAE in certain period, mainly because of changes of shareholders' equity. We can see the absolute change between ROE and ROAE in Tab 4.3:

Tab 4.3: Absolute change between ROE and ROAE (%)

	2010	2011	2012	2013	2014
ICBC	1.92	1.67	1.73	1.28	1.65
ABC	3.94	1.69	1.4	1.15	1.74
BOC	1.74	0.97	1.09	0.93	1.55
CCB	2.17	1.58	1.53	1.23	1.39
BOCOM	2.66	1.84	2.54	0.74	0.81
CMBC	3.5	2.27	2.19	2.73	1.5
CMSB	1.41	2.51	2.54	1.98	1.77
CITIC	1.32	3.09	0.98	1.1	1.14
SPDB	4.49	2.3	1.73	1.42	2.14
GDB	4.59	1.87	1.64	1.13	1.21

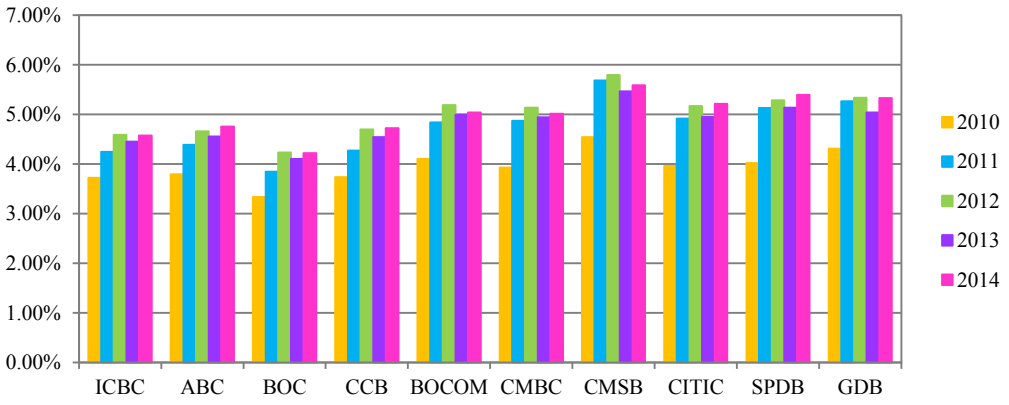
It is worth mentioning that shareholders' equity of large state owned banks did not show big change during a fiscal year except for ABC in 2010. The Ministry of Finance and Central Huijin Investment hold just over 70% shares of big four state owned banks. The Ministry of Finance and Chinese Society Security Fund hold 26.53% and 4.42% shares of BOCOM respectively. In 2010, A shares and H shares of ABC were listed on Shanghai Stock Exchange and Hong Kong Stock Exchange respectively.

For joint stock banks, there were big changes of shareholders' equity in certain fiscal years. CMBC received approval from CBRC to issue 2,007,240,869 A shares and 449,878,000 H shares in Stock Exchange in 2010. At the end of 2011 and 2012, total equity attributable to shareholders in CMSB increased by 34.54% and 25.83% respectively. CITIC Group subscribed for 4,823,154,716 A shares of CITIC bank in 2010. SPDB brought 1.08 hundred million A shares with the amount of 3.78RMB hundred million of another banks in 2010. GDB issued additional shares to shareholders who met the regulatory requirements and received 14.995 RMB billion fund paid by shareholders in 2010.

4.1.4 Earnings spread of selected banks

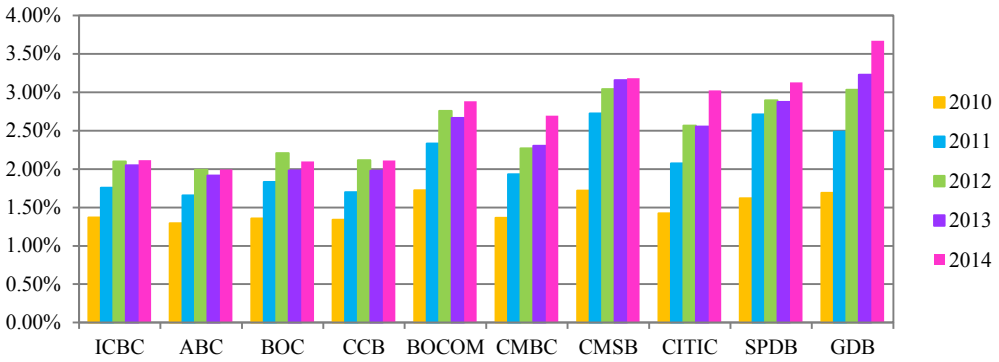
The following figures shows the average yield on interest earning assets and average cost on interest bearing liabilities of selected banks applying formula (3.8).

Figure 4.5: Average yield on interest earning assets



We can conclude that average yield on interest earning assets of big state owned banks were less than that of other banks. firstly, the big state owned banks hold large scale of interest earning assets. Secondly, Big four state owned banks have competitive advantage to selected high credit quality customers with low lending rate. And they must meet their obligation to help the state owned enterprises and the construction of large engineering projects by providing loans at low interest rate.

Figure 4.6: Average cost on interest bearing liabilities



Average cost on interest bearing liabilities of big four state owned were also less than that of other banks. Firstly, the big four state owned banks hold large scale of interest bearing liabilities. Secondly, guaranteed by state credit, the big four state banks could finance at low cost, and they can also get capital support by government during crisis instead of borrowing money at high interest rate.

The average cost on interest bearing liabilities of almost all the banks showed downward trend in the reporting period although the loan prime rate was declined from the second half of 2011 to 2014, which was mainly due to insufficient deposit.

According to previous figures, we compute the earing spread of selected banks as follows:

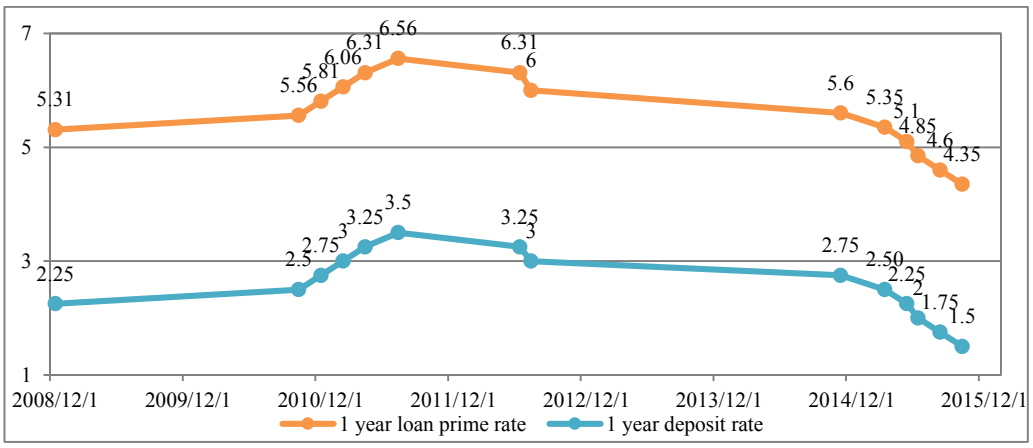
Tab:4.4: Earning spread of selected banks from 2010 to 2014

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	2.35%	2.50%	1.98%	2.40%	2.38%	2.56%	2.82%	2.54%	2.40%	2.62%
2011	2.49%	2.73%	2.01%	2.57%	2.51%	2.94%	2.96%	2.85%	2.42%	2.78%
2012	2.49%	2.67%	2.03%	2.58%	2.43%	2.87%	2.76%	2.60%	2.39%	2.31%
2013	2.41%	2.64%	2.12%	2.57%	2.33%	2.64%	2.31%	2.40%	2.26%	1.82%
2014	2.46%	2.76%	2.13%	2.62%	2.16%	2.32%	2.41%	2.19%	2.27%	1.66%

As is displayed in the Tab 4.4, earning spread of all banks represented same upward trend from 2010 to 2011. We should notice that earning spread of all banks showed same downward tendency from 2012 to 2013, except for BOC. We should analyze the reasons under overall economic environment.

Chinese government continuous implemented interest rate liberalization reform and adjusted interest rate for several times. We can see the benchmark interest rate in figure 4.8:

Figure 4.7: Benchmark interest rate (%)



Source: http://www.chinamoney.com.cn/en/index.html.

As shown in the figure, PBC raised the benchmark deposit and lending interest rates for five times from 2010 to 2011, of which the one-year deposit rate increased from 3% to 3.5%, and the benchmark rate of one-year loans was increased from 5.56% to 6.56%. The increase in average yield of loan was higher than increase in average yield of deposit, leading to the relatively wide spread. In 2012, the central bank on June 8 and July 6 twice cut the benchmark deposit and lending interest rate and expanded the floating range of deposit and lending rates. Deposit rates went up to 1.1 times of the benchmark interest rate, and the lending rate dropped to 0.7 times of benchmark interest rate. All of which had positive impact on earnings spread.

From 2013 to 2014, earning spread of big four state owned banks showed slightly upward tendency, while earning spread of other banks declined except for SPDB and CMSB.

Confronting with the interest rate liberalization reform, large banks primarily adjusted their structure of interest earning assets, improved the yield of interest earning assets, reduced the cost of interest bearing liabilities and restructured balance sheet.

ICBC accelerated the establishment of RMB deposit market-based pricing mechanism, reinforced RMB loan pricing management and stabilized the earnings spread. ABC grasped the favorable investment opportunities and increased the investment resulting from significant rose in the yield in investment business. ABC also future optimized the loan structure, strengthened loan pricing management and tightened liabilities management. BOC expanded the scale of low cost core deposit, increased the lending rate, optimized foreign currency structure and raised securities investment. CCB improved its ability of financial service and tightened lending requirements.

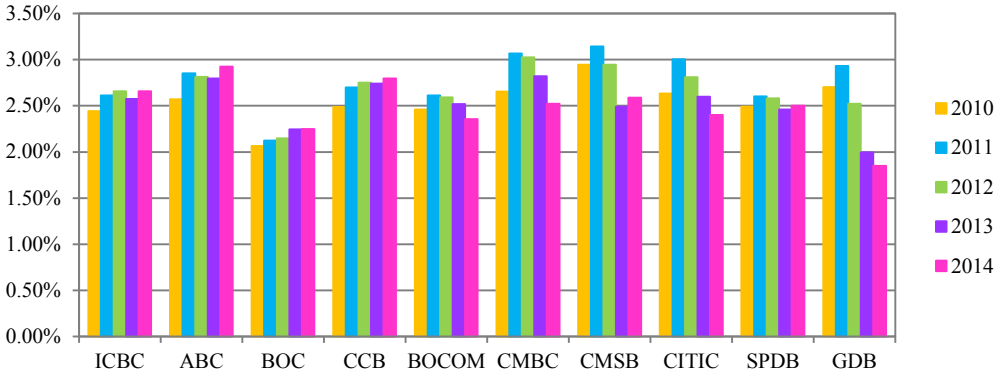
Earning spread of BOC was less than that of other state owned banks. As the most international bank in China, overseas market is another major area for business development, and charge of commission takes great proposition in its overseas profits. Net non-interest income accounted for about 30% of operating income, which is the greatest among big four state owned banks.

Under the context of interest rate liberalization, slightly changing tendency of earnings spread in SPDB was at odds with the sharp fluctuation of that in other joint stock banks. Earnings spread of CMSB reached the peak of 2.96% in 2011, mainly due to high interest spread of treasury business, and declined to the lowest level of 2.3% in 2013. Earnings spread of CITIC was 2.85% in 2011, up by 0.31% year on year. In addition to the adjustment of interest rate, CITIC optimized the allocation of resource, enhanced management of assets and liability, adjusted business structure, rational controlled high cost capital and expanded high yield business area in 2011. For GDB, earnings spread stood at bottom level of 1.66% in 2014. In 2014, the narrow earnings spread was caused by accelerating interest rate liberalization that upper limit of deposit interest rate was increased to 1.2 times of benchmark rate from original 1.1 times.

4.1.5 Net interest margin of selected banks

Adopting formula (3.5), net interest margin of selected 10 banks is provided in figure 4.8:

Figure 4.8: Net interest margin of selected banks from 2010 to 2014



We find from the figure that the fluctuation of net interest margin in large state owned banks was steadily increasing from 2010 to 2014. While the net interest margin of other banks showed declined trend from 2011 to 2014 We can explain the reason according to customer structure.

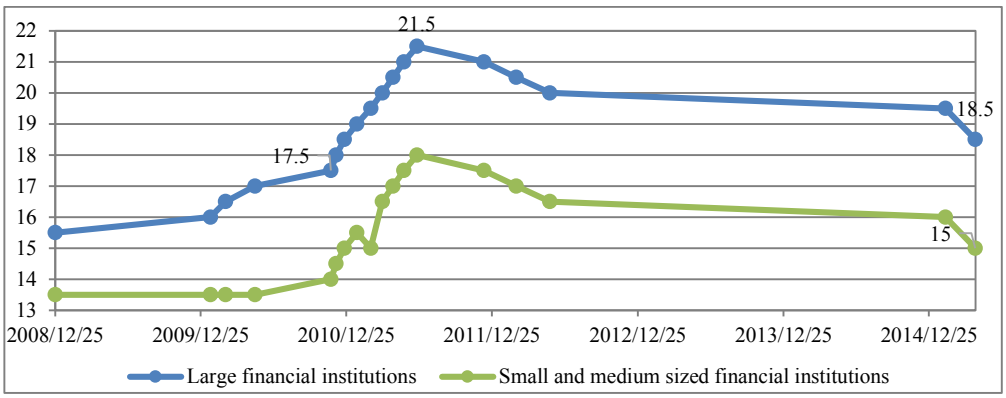
Major customers of large state owned commercial banks are large and medium sized state owned enterprises, which have deep business relationship with large state owned banks and are less likely to finance from other banks. With the stable clients, big four state owned banks have advantage to slightly increase the lending rate of some kind of loans. However, main customers of joint stock banks are small and medium sized enterprises, as well as retailer. It is more probability for small and medium sized enterprises to change their lenders. Compared with large state owned enterprises, small and medium sized companies are more prefer to bargain with banks about interest rate and are more sensitive to the change of interest rate. The capital demand and supply of small and medium sized companies vary with the economic situation.

This figure shows that the trend of net interest margin was paralleled with the trend of earnings spread from 2010 to 2013. Expect for interest rate liberalization and other factors mentioned previously, there were other additional reasons causing this situation:

From 2012 to 2013, the hope for RMB appreciation had faded, and domestic individual residents and corporations were more willing to hold foreign exchange, which causing the fast increasing foreign currency deposit and declining loans.

In order to optimize liquidity management and maintained a reasonable social financial size, central banks adjusted reserve requirement ratio several times. We can see it in figure 4.10:

Figure 4.9: Reserve requirement ratio (%)

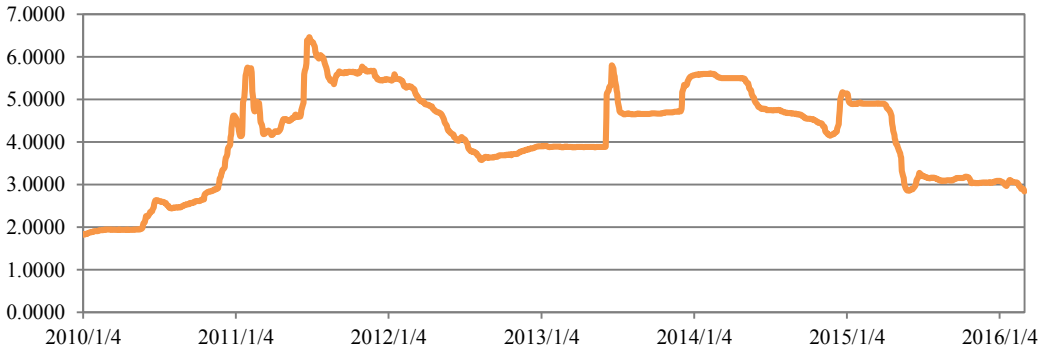


Source: http://www.pbc.gov.cn/english/130437/index.html#.

From 2010 to 2011, central bank raised the reserve requirement ratio of deposit taking financial institutions several times, each time by 0.5%, raising the reserve requirement ratio cumulatively by 5%. Lending rate of every bank raised due to decrease of credit supply, which was another reason causing an increase of interest income. From December. 2012 to 2013, PBC decreased the reserve requirement ratio for two times, cumulatively down by 1%. Net interest income dropped correspondingly.

Lastly, Shanghai Interbank Offered Rate (Shibor) also has great impact on net interest income. We can see three month Shibor in figure 4.11:

Figure 4.10: Three month Shibor (%)



Source: http://www.shibor.org/shibor/web/DataService_e.jsp.

The 3 month Shibor remained relatively low from 2010 to 2011, which means banks had enough remaining money to invest into stock market and focused on other investment activities to earn interest income. In contrast, high Shibor caused the rise of financing cost in banks from 2011 to 2013. But for big four state owned banks, they could get directly support of government in face of liquidity crisis from 2011 to 2012. In 2011, Central Huijin Investment brought around 2 RMB hundred million stocks of big four state owned banks.

Although net interest margin of other banks declined from 2012 to 2013, net interest margin of BOC was 2.24% in 2013, an increase of 0.09%. With the domestic interest rate environment and low overall interest rate in international financial market, BOC optimized the structure of oversee assets, and reduced the holding of low interest assets. The BOC also enhanced its active liabilities management and improved the stability of customer deposits, thus effectively controlled its liabilities costs. Lastly, BOC focused to the capital saving and accelerated the restructuring of customer structures. In 2013, RMB-denominated medium sized enterprises loans increased by 18.19%. Personal loans made up 51.09% of total new domestic RMB-denominated loans, which increased the domestic personal loans' proportion domestic loans by 1.69% to 30.8%.

The bar chart also illustrates that net interest margin of all selected banks ranged varied between 1.85% and 3.14% during the period between 2010 to 2014. And net interest margin reached the peak of 3.14% for CMSB in 2011. In contrast, net interest margin hit the lowest point of 1.85% for GDB in 2014.

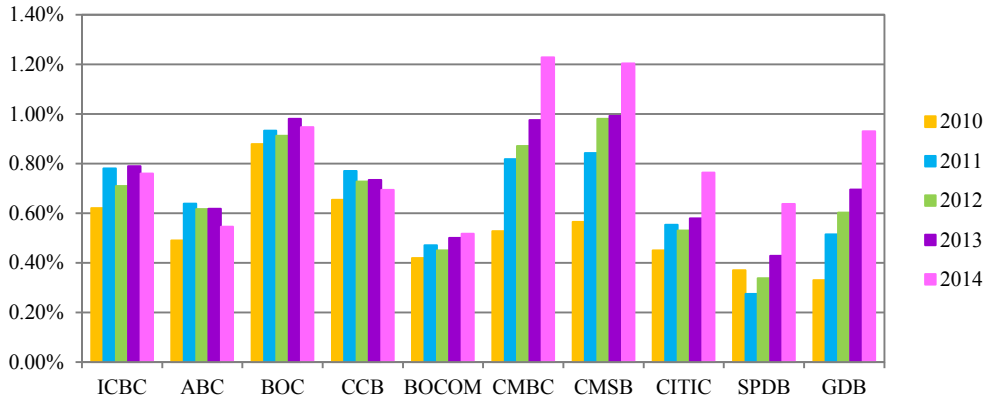
For CMSB, the increase of net interest margin was due to effectively adjustment of business structure, higher interest spread of treasury business, as well as the adjustment of benchmark interest rate we referred previous. For GDB, besides the interest rate liberalization that PBC increased the upper limit of deposit interest rate to 1.2 times of benchmark rate from the originally 1.1 times in 2014, most important reason that caused the lowest level of net interest margin was the increase in the proportion of interbank assets and liabilities. In 2014, in order to promote the agency service of various assets management products for financial institutions and improve the ability of channel marketing, GDB focused on corporation with small and medium banks to

establish the interbank system. And the bank ranked among the top three joint stock banks in interbank trading.

4.1.6 Net non-interest margin of selected banks

The following bar graph illustrates the net non-interest margin of selected banks adopting formula (3.6).

Figure 4.11: Net non-interest margin of selected banks from 2010 to 2014



The figure states that net non-interest margin of big four state owned banks varied little during the reporting period. But net non-interest margin of other banks represented remarkable upward trend from 2010 to 2014, except for SPDB in 2011.

Facing relatively loose supervision of operating new business and more stressful job pressure, joint stock banks have more motivation to innovate than that of large state owned banks. Main customers of joint stock banks are small and medium sized enterprises, which have more requirements in non-interest business. So the joint stock banks are the leaders in terms of operating non-interest business in Chinese banking industry. With the impact of interest rate liberalization, joint stock banks continuously developed new business and products to satisfy their customers, causing the big fluctuation in non-interest margin.

Net non-interest margin of BOC was significantly higher than which of ICBC, ABC and CCB. Charge from agency commissions and bank card accounted for more than 50% of total net non-interest income in BOC. BOC has obvious competitive advantage in foreign currency exchange business over other banks. BOC strengthened

its advantage in bond underwriting and cooperated with fund companies to research and develop new products,

For BOCOM, net non-interest margin was 1.15%, increased by 0.3% compared with that of 2013. Net non-interest income increased by 3.636 RMB billion in 2014, equivalent to an increase of 14% compared with that of previous year. Management service and bank card were main driver of the increase of non-interest income.

For CMBC, net non-interest margin was 1.15% in 2014, up by 0.3% as compared with that of previous year. Net non-interest income amounted to 42,817 RMB million, representing an increase of 9,802 RMB million as compared with that of 2013, which was mainly due to the increase in fee and commission income from agency services and bank card services.

For CMSB, net non-interest margin was 1.2%, up by 0.21% as compared with the corresponding period of previous year, which was mainly due to the increase in exchange gains, income from the lease of precious metal and proportion of income from leasing business of subsidiaries.

For CITIC, net non-interest margin was 0.76% in 2014, an increase of 0.28% over the previous year. The bank realized the non-interest income of 30,098 RMB million, an increase of 10,973 RMB million over former year. The increase was primly due to rapid growth in bank card fee, consulting and agency fee, and wealth management service fee.

For SPDB, Net non-interest margin down to 0.27% in 2011, a slightly decrease of 0.1% over previous year. Non-interest income was 6,477 RMB million in 2011, declined by 239 RMB million over previous year, due to the decrease of consulting and advisory fee.

For GDB, on account for the development of wealth management, agency and consulting services, net non-interest margin reached the highest point at 0.93% in 2014.

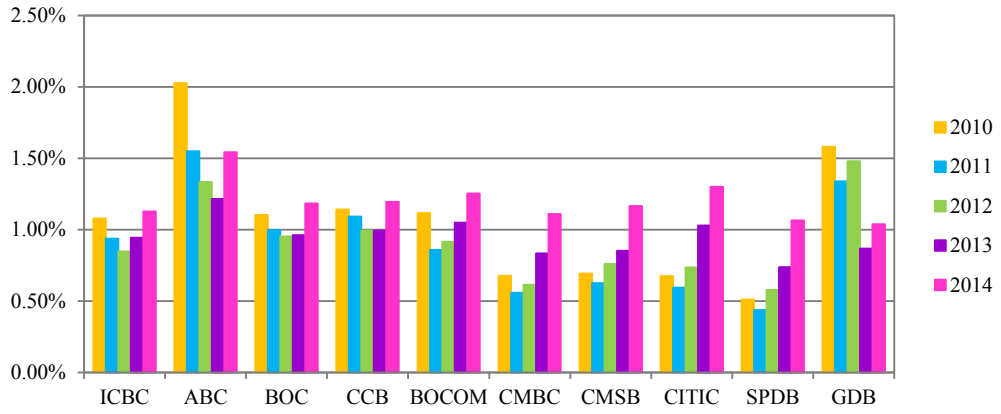
4.2 Credit risk ratio of selected banks

Using related data, we computed NPL_R, provisioning rate and coverage ratio with the purpose of investigating financial conditions of selected banks.

4.2.1 Non-performing loan ratio of selected banks

We can find NPL_R in the following figure by using equation (3.10).

Figure 4.12: NPL_R of selected banks from 2010 to2014



We could clearly see that NPL_R of state owned banks was greater than that of other banks. Stated owned banks assumed more social responsibilities, focusing on supporting advanced manufacturing, modern services and cultural industries. Big four state owned banks were always the creditors of large heavy industries companies. With the persistence of excess capacity and the failing commodities prices, NPLs of large corporations accounted for more than 50% of total NPLs.

NPL_R of all banks grew to their highest points in 2014, except for ABC and GDB. The continuously growth of NPL_R in all banks was mainly due to impact of large economic environment.

Firstly, *following the financial crisis in 2009, a government led loose credit environment coupled with a state directed RMB 4 trillion financial stimulus package gave a tremendous boost to economy. China debts rose rapidly, fueled by real estate*

lending and shadow banking activities[4]. By June 2014, China's debt to GDP ratio reached 282%, this increased leverage places additional pressures on China's corporation sectors to continue growing cash flow to service debt payment.

Secondly, many NPLs have been concentrated on manufacture and retail industry, the excess capacity has created great pressure to export and product distribution since 2010. In the course of de-production capacity, de-inventory and deleveraging readjustment to the real economy, some enterprises suffer production or operational difficulties, with a higher frequency of market entry and exit. Economic transformation and industrial structural adjustments will no doubt cause some NPLs.

Thirdly, China is now facing a slower growth phase than that of previous years. In 2014, China's annual GDP growth rate was 7.4%, slightly shy of its target of 7.5% and the lowest for last 14 years.

NPL_R of ABC reached the zenith of 2.03% in 2010, then fell markedly from 2010 to 2011. ABC mainly provided its loan to customers in Western China and some certain industries, such as manufacturing, wholesale and retail. So there was higher default probability of ABC than that of other state owned banks.

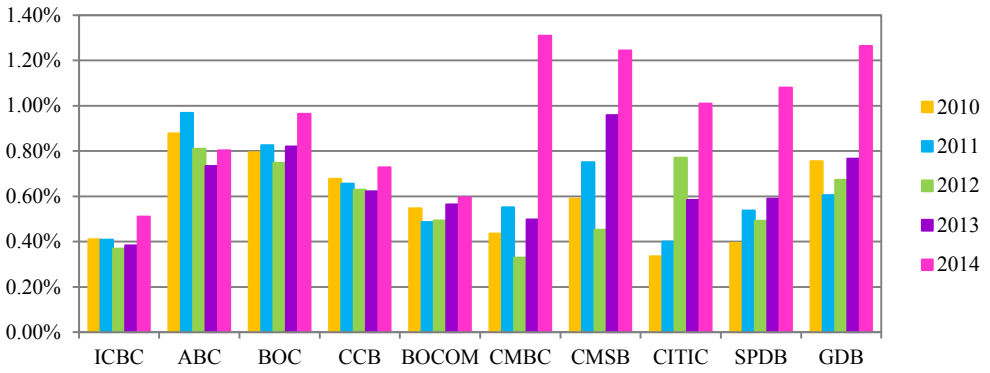
On the whole, GDB had the highest ratio of NPL among joint stock banks, which was mainly because of its geographic locations and target customers. Manufacture and real estate industry account for the major proportion of total NPLs in Chinese banking industry. By region, NPLs are mostly been concentrated in the Eastern of China. Guangzhou is the most important city in Eastern China and has the most developed manufacture industry. GDB, headquartered in Guangzhou, mainly serve small manufacturing firms and individual customers.

[4]http://www.pwchk.com/webmedia/doc/635853667086245285_china_npls_opportunities_for_investors_dec2015.pdf

4.2.2 Provisioning rate of selected banks

We calculate the provisioning rate applying formula (3.11):

Figure 4.13: Provisioning rate of selected banks from 2010 to 2014



People's Bank of China stipulates that commercial banks should classify their loans into five categories: normal (pass) loan, special mention, substandard loan, doubtful loan and loss loan. The "Bank Loan Loss Provision Guidelines", revealed by CBRC, stipulated that provisions for loan loss include general, special and specific provisions. General provision should be no less than 1% of the loan balance at the end of year. Provision reserve of specific loan can be determined by commercial banks themselves. Specific provisions are fund set aside according to the following standards:

Tab 4.4: Provision reserve of different loan classifications

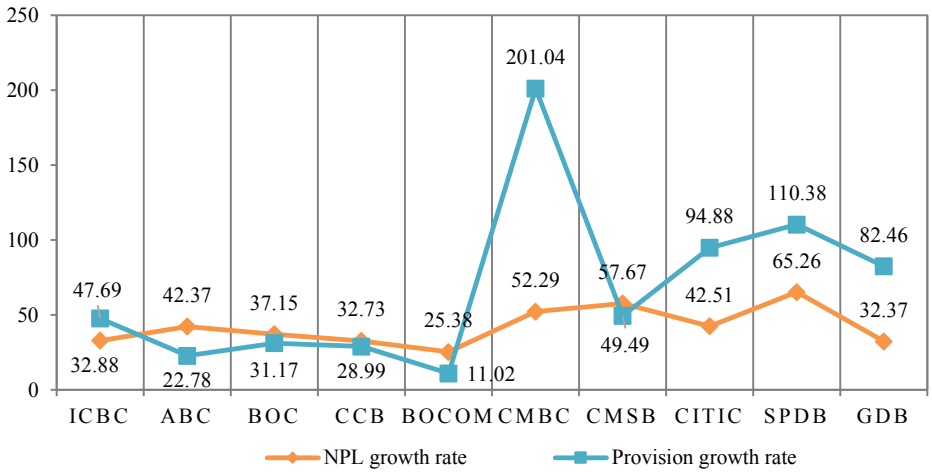
	Provision reserve	Probability of default
Pass/Normal loan	1%	0
Special mention	2%	No more than 5%
Substandard	25%	30%-50%
Doubtful	50%	50%-75%
Loss	100%	75%-100%

Source:http://202.119.108.161:93/modules/ShowPDF.aspx?GUID=b9197b6e444347939f786b6ada2cc0c4.

For substandard loan and doubtful loan, the provision reserve can fluctuate in the upper and lower ratio of 20%.

The figure indicates that provisioning rate of state owned banks was increasing steadily from 2013 to 2014. But there was rapidly upward trend of provisioning rate in joint stock banks. The provision has relationship with NPLs, which was illustrated as follows:

Figure 4.14: NPL and provision growth rate from 2013 to 2014 (%)



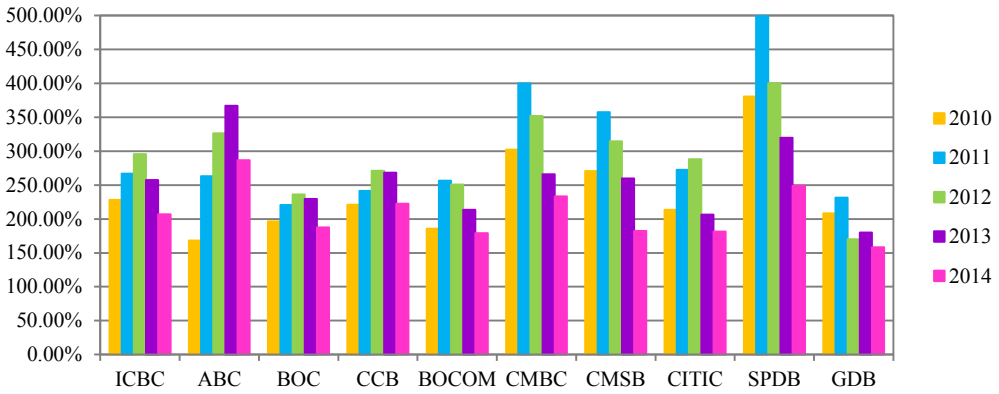
Source: Annual report

Comparing with figure 4.15, joint stock banks held both high growth rate of provisioning rate and high NPL growth rate from 2013 to 2014. For state owned banks, NPL growth rate of state owned banks got close to provision growth rate. In the period of economic transformation, medium and small sized enterprises, which are the major customers of joint stock banks, exit market quickly. In the course of credit management, state owned banks have greater ability to control and prevent risk than that of joint stock banks. Unlike CMSB, other joint stock banks kept large spread between NPL growth rate and provision growth rate, which was result from the high growth rate of special mention loan. The special mention loan of CMBC was up by 89.5% in 2014, compared to that in 2013.

4.2.3 Coverage ratio of selected banks

Applying formula (3.13), we measure the 10 banks' ability to make up a loss as follows:

Figure 4.15: Coverage ratio of selected banks (%)



Coverage ratio of Chinese banking industry was required to be minimum 150% before 2016. The coverage ratio of Chinese banking industry was higher than that of other countries' banking industry. Because banks are stipulated to make provisions even for normal loan, which takes more than 90% of total loan. The figure shows the coverage ratios of state owned banks were relatively low, which means most of the joint stock banks took risk more cautiously. Coverage ratios of all the banks were declined during the period from 2013 to 2014. Rapid growth of NPL caused the decrease of coverage ratio.

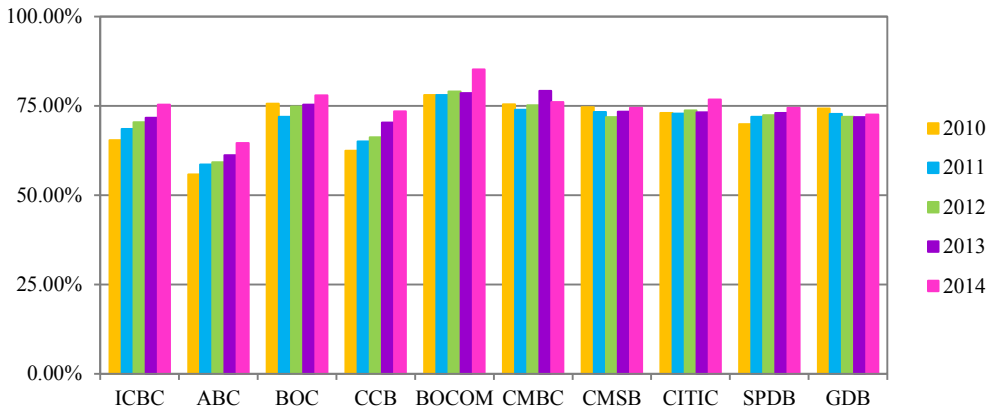
Coverage ratio of SPDB was up to 499.6% in 2012, with an increase of 119% compared to that of previous year. The rapid growth of LLA was primary due to rebound of NPL in the fourth quarter of 2012. At the end of 2012, NPL of SPDB was increased by 6.53RMB hundred million compared to that of the third quarter in 2012. LLA of SPDB was 74.99RMB hundred million, including 37.8 RMB hundred million in the fourth quarter of 2012. According to the figure, coverage ratio of SPDB maintained highest level in banking industry, but the NPL_R and ROA were relatively lower than that of other selected banks. Some investors thought SPDB concealed the high profits by intentionally increasing the amount of impairment loss. The manager explained that the bank applied prudent accounting policy. If the bank lower coverage ratio, the profit will be high.

Like SPDB, CMBC and CMSB kept higher coverage ratio than that of other banks. The two banks announced that they were more careful about their risk and they adopted prudent accounting policy.

4.3 Loan to deposit ratio of selected banks

Applying formula (3.18), we use LTDs to assess the 10 banks' liquidity level, which was shown as:

Figure 4.16: LTD of selected banks from 2010 to 2014



The figure shows LTD of ABC was least among the other banks. ABC has the most enormous branches and wide business scope in mainland China. So ABC has strong capability to absorb deposits to maintain low LTD.

In order to prevent the over expanded of balance sheets and payment crisis of banks, in 1995, Chinese regulatory authorities regulated that LTDs of commercial banks must be below or equal to 75% with the passage of Commercial Banking Act. In 2009, CBRC allowed LTD of small and medium sized healthy banks to be breached. But CBRC has faced great challenge to ensure banks to carry on this rule since 2010.

In 2010, there were 6 banks kept their LTDs above 70%. LTDs of CMBC was 75.45% at the end of this year. Because the percentage of retail loans in the portfolio of loans kept increasing, which was primary due to diversified development of retail loan business, including retail housing loans, credit card receivables and personal operational loans. In the first five months of 2010, monthly LTDs of CITIC were above 75%, the bank rapidly reduced its loan, and the volume of loan was down by 135% on July 2010 in order to reach the target. With the purpose of reducing LTDs and reaching the regulation standard at the end of month or quarter, some banks significantly raised deposits from irregularities such as offering premium or high deposit rate. In order to

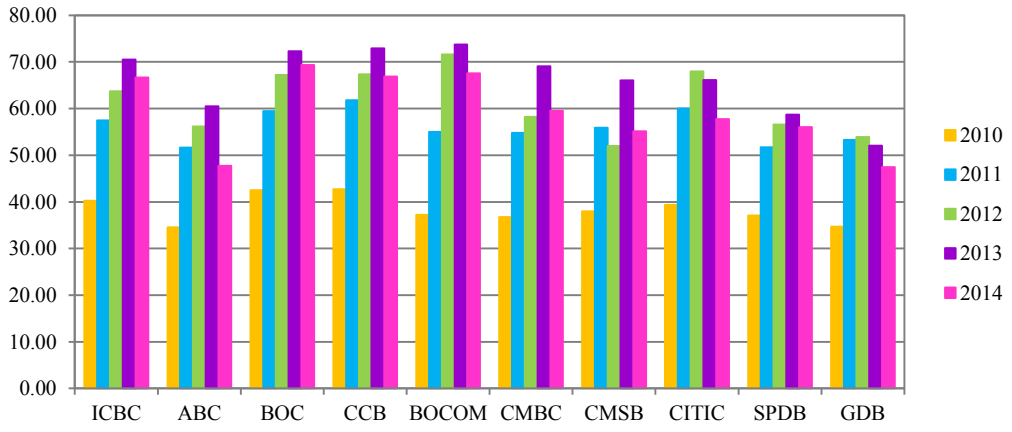
avoid such behavior, CBRC had announced that it would monitored average daily LTDs since June 2011.

But there were still many banks did not obey this rule. In the middle of 2011, LTDs of BOCOM were above 75%. At the end of third quarter in 2011, LTDs of BOC, BOCOM, CMBC and CMSB were above 75%. At the end of 2014, almost all the selected banks kept their LTDs above or very closely to 75% except for ABC. The rule that LTD should never be greater than 75% has been removed by The Standing Committee of National People's Congress since August 29, 2015.

4.4 Risk index and P(BV) of selected banks

We estimate the risk index and probability of insolvency of selected banks by applying equation (3.24) and equation (3.25):

Figure 4.17: Risk index of selected banks from2010 to 2014 (%)



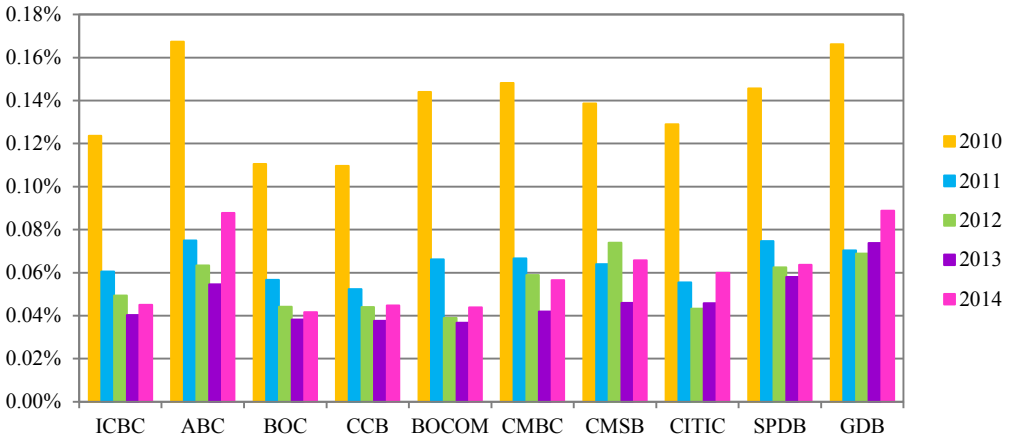
The selected banks experienced big fluctuation in terms of risk index during reporting period. ABC kept the least risk index of 35.55% in 2010, owing to least CAR. Because of greatest E(ROA) and least S_{ROA} in 2013, the risk indexes indicate that all the banks became safer in 2013 than that in 2010, especially the BOCOM.

The risk index of all the banks declined from 2013 to 2014 as the result of great S_{ROA}. There is some relation between banking risk and competition. With the development of internet finance and privately owned banks in 2014, banks were less safe than that of 2013.

The risk index of ABC was less than that of other big four state owned banks on account of its low value of CAP. We can conclude that ABC was the least safety bank among big four state owned banks.

We calculate the bankruptcy possibility of the selected banks according to formula (3.25).

Figure 4.18: Probability of insolvency from 2010 to 2014

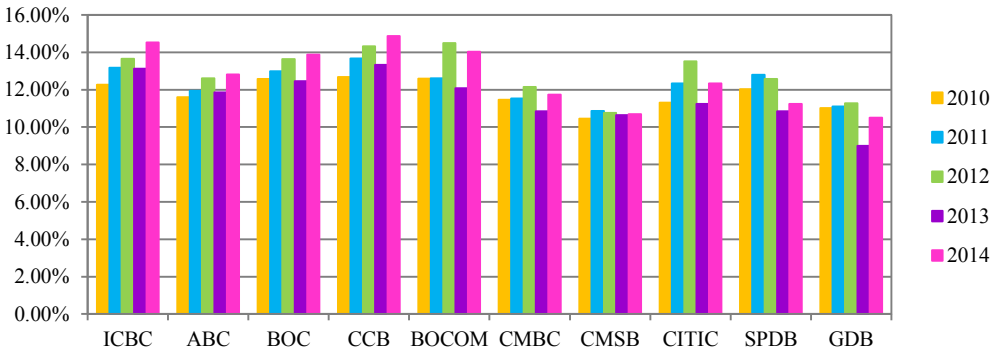


From the figure we can see the probability of insolvency in selected 10 banks were very low, and all of the P(BV) were below 0.2%. The P(BV) reached the top in 2010, which was primary due to the low risk index.

4.5 Capital adequacy ratio of selected banks

We estimate the Capital adequacy ratio in figure 4.19 applying formula (3.26):

Figure 4.19: Capital adequacy ratio of selected banks from 2010 to 2014



CAR of state owned banks was greater than that of joint stock banks. Because the CAR of joint stock banks and five state owned banks should be equal or greater than 8.5% and 9.5% respectively before the end of 2013. CBRC required that CAR of systemically important banks (five state owned banks) should not be less than 11.5% since 2013, and CAR of non-systemically important banks should not be less than 10.5% since 2016.

CAR of all the banks declined from 2012 to 2013 and increased from 2013. Because CBRC issued the Rule of Regulating the Capital Adequacy Requirement of Commercial Banks in 2013. The new rules added the other intangible assets deducting items, increased the risk weight of some assets items, and added the requirement of operational risk capital. Due to the increased value of risk weighted assets, CAR of the banking industry decreased by 0.85% in 2013.

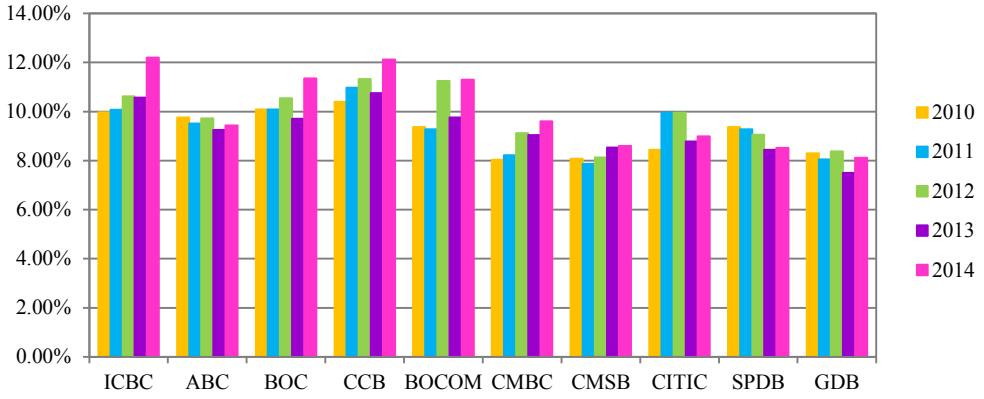
CAR of all the banks began to raise again in 2014. Because the credit risk weighted assets, market risk weighted assets and operational risk weighted assets showed downward trend from 2013 to 2014. Since the second quarter of 2014, banks were approved to apply new methods to calculate banks' assets, including internal rating approach for credit risk, internal model approach for market risk and standard approach for operational risk. The risk weighted assets declined by 1.3 RMB trillion in the second quarter of 2014.

CAR reached the bottom of 9% from GDB in 2013, and the peak of 14.59% from CCB in 2014. In 2014, CCB was approved by CBRC to implement the advance measurement approach for capital management, and this approach was favorable to the increase of CAR. This year, CCB conducted capital instruments innovation, and the issuance of new eligible capital instruments effectively replenished the capital base.

4.6 Tier 1 capital ratio of selected banks

By using formula (3.28), we can calculate the selected banks' tier 1 capital ratio from the regulator's point of view in figure 4.26:

Figure 4.26: Tier 1 capital ratio of selected banks from 2010 to 2014



Core tier 1 capital ratios of state owned banks were greater than that of joint stock banks. CBRC stipulated that Core tier 1 capital ratio of systemically important banks and non-systemically important banks should not be less than 7.5% and 6.5% respectively in 2013. Core tier 1 capital ratio of both systemically important banks and non-systemically banks should grow 0.4% year by year from 2013, until they were up to 9.5% and 8.5% respectively by the end of 2018.

In the face of stricter capital requirement and regulatory environment, Core Tier 1 capital ratios of many banks were fell from 2012 to 2013. Investing too much money into real estate and other high risk areas over the past few years also brought great pressure to banks' capital. In order to replenish capital, banks showed strong desire to issue A shares and H shares in Shanghai Stock Exchange and Hong Kong Stock Exchange respectively. However, a large amount of refinancing in recent years and rapid growth of NPL in 2014 made the investors scared to hold bank shares. In the first half of 2014, the A shares of 16 listed banks broke the buck many times. Many banks tried to issue preferred stocks for financing.

Core tier 1 capital ratios of the state owned banks reached the top in 2014, because they were approved to first sale noncumulative preferred shares to shore up Tier 1 capital. In 2014, ICBC issued dollar-dominated, euro-dominated and RMB-dominated redeemable preferred stocks, which were total up to 56.4$ hundred million. In November 2014, 400 RMB hundred million preferred stocks issued by ABC were listed on Shanghai Stock Exchange. In October 2014, BOC had set the yield on its 6.5$ billion worth of offshore preferred stocks at 6.75%. CCB announced its plans to raise up to

80RMB billion through issuing preferred stock in order to comply with strict capital requirements.

As the only non-listed bank among the selected bank, GDB has limited access to finance so as to supplement capital. Both CAR and core tier 1 capital ratio still have remained low in banking industry over the past five years. It was urgent for GDP to obtain the capital by going public, and GDP was listed on the Hong Kong Stock Exchange in 2015.

4.7 Summary

By calculating some primary ratios indicators, we compared profitability, credit risk, liquidity, safety and capital adequacy of big four state owned commercial banks to other banks from 2010 to 2014.

The ROA and ROE of the whole selected banks were at the zenith of 1.4% from CCB in 2013 and of 22.58% from CMBC in 2012 respectively. On the other hand, both ROA and ROE of the whole selected banks reached their nadir of 0.73% and 13.76% respectively from GDB in 2014. During reporting period, the net profit growth rate of entire Chinese banking industry reached peak of 39.3% in 2011, and got the lowest point of 10.5% in 2014. The ROA and ROE of almost all the selected banks showed downward trend from 2013 to 2014 under the influence of macroeconomic environment. The whole selected banks still had strong ability to earn profit, with average ROA of 1.14% and average ROE of 18.28%. Because of the special government support, big four state owned banks had stronger capability to convert assets into net profit than that of other banks, with the five years' average ROA of 1.22%. While the average ROA of other banks was 1.08% during reporting period.

The average earnings spread of all the selected banks reached to the highest point of 2.96% from CMSB in 2011 and the bottom of 1.96% from GDB in 2014. For a long time, net interest income has accounted for more than 80% of Chinses banks' net profit due to specialized business model in finance. Under this situation, interest rate marketization undoubtedly caused the narrow earning spread of banking industry. The average earning spread of the selected 10 banks was 2.46% in 2014, down by 0.16%

compared to that of 2010. During the period from 2010 to 2014, the average earnings spread of big four state owned banks was slightly increasing from 2.31% to 2.49%, while the average earnings spread of other 6 selected banks declined from 2.56% to 2.17%. The main reason that caused this situation is that the big four state owned banks have stronger ability to optimized their capital structure than that of other banks.

The net interest margin of the whole selected banks got the top of 3.14% from CMSB in 2011, which was opposite to the bottom of 1.85% from GDB in 2014. With the lowest point of GDP growth rate in 2014, average net interest margin of the 10 banks declined from 2.52% to 2.48% during the period from 2013 to 2014. Due to the stable source of customers, net interest margin of big four state owned banks was 2.66% in 2014, a slight increase of 0.27% compared to that in 2010. The net interest margin of other banks decreased from 2.65% to 2.37% during the period from 2010 to 2014.

The net non-interest margin of selected 10 reached their zenith of 0.99% from CMSB in 2013, comparing to the bottom of 0.27% from SPDB in 2011. Average net non-interest margin of joint stock banks was increasing apparently from 0.45% to 0.95% during the period between 2010 and 2014. Because of more stressful job pressure and relatively loss supervision of operating new business, the joint stock banks have more motivation to innovate than that of state owned banks in order to rapidly increase their net interest income.

The NPL ratio of selected banks was at the highest point of 2.03% from ABC in 2010 and at the lowest point of 0.44% from SPDB in 2011. With the maturity of state directed 4 RMB trillion financial stimulus package from 2014 to 2016, slowdown in GDP growth rate and de-production capacity, de-inventory and deleveraging readjustment to the real economy, Chinese banking industry suffered serious NPL problem in 2014. The NPL ratio of selected banks was 1.2% in 2014, up by 0.25% compared to that of previous year. Overall, the state owned banks had large amount of NPLs, but the NPLs growth rate of joint stock banks was higher than that of state owned banks. Because the small and medium sized enterprises, which are the major customers of joint stock banks, enter and exit market so quickly that they can provide NPLs fast.

The provisioning rate of selected banks reached the peak of 1.31% from CMBC in 2014, and reached the nadir of 0.34% from CITIC in 2010. With the rapid increase of NPLs from 2013 to 2014, the average provisioning rate of the 10 banks was 0.95% in 2014, an increase of 0.3% compared to that of prior year. Because of the faster NPLs growth rate, the average provisioning rate of joint stock banks was 1.18% in 2014, up by 0.5% compared to that of 2013. While the average provisioning rate of big four state owned banks was 0.75% in 2014, an increase of 0.13% compared to that of previous year.

The coverage ratio of selected banks reached the highest point of 499.61% from SPDB in 2011, and reached the lowest point of 158.21% from GDB in 2014. Chinese banks kept coverage ratio above 180%, which was higher than that of other countries' banks because of China's provision system. The five tier provision reserve system requires that Chinese banks should make 1% provision of their normal loan, which accounts for more than 90% of total loans. The average coverage ratio of state owned banks and joint stock banks were 241.84% and 275.87% respectively. The joint stock banks adopted more prudent policy to make provisions because of their weak ability to prevent risk.

Owing to regulatory policy that LTD of Chinese commercial banks should be not more than 75%, the LTD of selected banks fluctuated around 75%. LTD of big four state owned banks and other banks were 68.19% and 74.69% respectively. Because of the adverse effect on banking industry and opposition by economists, this rule was removed in 2015.

The risk index of selected banks was at the zenith of 73.74% from BOCOM in 2013 and bottom out at 34.69% from GDB in 2010. The risk index of almost all the selected banks reached the top in 2013, then declined from 2013 to 2014 due to unfavorable economic situation. The big four state owned banks kept average risk index of 58.58%, which was higher than that of 54.77% for other selected banks. The average P(BV) of selected banks kept stable of 0.06% from 2011 to 2014. Chinese banks had very low probability to get bankruptcy during reporting period because of the low value of S_{ROA}.

From 2013 to 2014, capital adequacy ratio and Tier_1 ratio of all the selected banks showed upward trend because of the new rules announced by CBRC in 2013. The new rules added the other intangible assets deducting items, increased the risk weight of some assets items, and added the requirement of operational risk capital. Average capital adequacy ratio and tier 1 ratio of selected banks was 12.24% and 9.51% respectively during reporting period. For the different supervision requirements, the capital adequacy ratio and tier 1 ratio of state owned banks were higher than that of joint stock banks. For state owned banks, the average capital adequacy ratio and tier 1 capital ratio were 13.11% and 10.37% respectively during reporting period. For other banks, the capital adequacy ratio and tier 1 capital ratio were 11.37% and 8.65% respectively during five years. With the gradually growing required capital adequacy ratio and tier 1 ratio, more and more banks try to supplement capital by issuing preferred stocks.

5 Conclusion

Banking industry is the most important entity in financial system and the sound bank performance plays major role in the stability of banking system. Banking industry helps the individual investors and the corporate investors to continue their business by providing funds for them. We should be very careful with performance of banking industry.

This thesis mainly provided comparison of Chinese big four state owned commercial banks to other banks from 2010 to 2014 by specially analyzing different financial indicators (profitability ratios, credit risk ratios, capital adequacy ratios and so on). To accomplish this objective, we divided this thesis into three main chapters.

In chapter 2, we made comprehensive introduction of characteristics of banking industry, including types of banks, role and basic functions of banking industry, and regulation of banks. We stated new trends of banking industry by illustrating information of global symmetrically important banks and some other large banks. For introducing Chinese banking industry, we described central bank, big four state owned banks, other banks, private banking and role of Chinese government. By contrasting total assets of PBC, ECB, and FED, we concluded that foreign exchange accounted for largest proportion in total assets of PBC among that of other major central banks. In 2014, China's big for state owned commercial banks ranked highest on assets and tier 1 capital through comparing world large banks. As for the private banking, China Merchants Bank hold a lead in terms of holding assets of customers. Chinese government plays an important role in state dominated banking industry.

In chapter 3, we explained frequently used ratio indicators, including profitability ratios, credit risk ratios, liquidity ratios, market risk ratio, capital adequacy ratios and so on. The whole ratios show banks' performance in different aspects. In order to continue the central in this thesis, some of the ratios would be applied in the following chapter.

In chapter 4, we concentrated on contrasting big four state owned commercial banks and other 6 selected banks from 2010 to 2014 by calculating some ratio indicators.

In a word, Chinese banking industry suffered significant decline in net profit growth rate and serious problem in NPLs from 2013 to 2014. ROA and ROE of almost all the selected banks showed downward trend from 2013 to 2014. Along with the increasing NPL_R, provisioning rate of selected 10 banks was also rising from 2013 to 2014. Chinese banking industry held high average coverage ratio of 180% due to its 1% provision reserve for normal loans. Owing to the new rules that required the addition of the other intangible assets deducting items, the risk weight of some assets items, and the requirement of operational risk capital, capital adequacy ratio and tier 1 capital ratio were declining from 2013 to 2014.

Because of the stable source of customers, strong anti-risk capability and direct government capital injection in times of crisis, big four state owned banks kept greater ROA, ROE, net interest margin and earning spread under the unfavorable economic environment. While the joint stock banks were better at operating fee and commission business. We concluded that the big four state owned banks was more safe than other selected banks because the average risk index and average P(BV) of big four state owned banks were 58.58% and 0.07% respectively, while the average risk index and average P(BV) of other selected banks were 54.77% and 0.08% respectively. Under the Basel Accord, CBRC stipulated higher level of capital adequacy requirements in state owned banks than that of joint stock banks.

To conclude, facing downward GDP growth rate, changing monetary policy and uncertainty economic situation, big four state owned banks had stronger capability to make sure their sound operations, while the other banks experienced fluctuation resulting from their weak ability to prevent and reduce risk. At the same time, the big four state owned banks were required to meet more strengthen regulatory and capital adequacy requirements.

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List of Abbreviations

ABC	Agricultural Bank of China
ADBC	Agricultural Development Bank of China
BOC	Bank of China
BOCOM	Bank of Communications
CMBC	China Merchants Bank
CITIC	China Citic Bank
CEB	China Everbright Bank
CDB	China Development Bank
CBRC	China Banking Regulatory Commission
CMBC	China Minsheng Bank
CCB	China Construction Bank
EIBC	Export and Import Bank of China
ECB	European Central Bank
FED	Federal Reserve Banks
GDB	Guangfa Bank
HXB	Hua Xia Bank
ICBC	Industrial & Commercial Bank of China
LLA	Loan Loss Allowance
LTD	Loan to deposit ratio
NPL	Non-performing loan
PSBC	Postal Saving Bank of China
PBC	People's Bank of China
ROA	Return on equity
ROAA	Return on average assets
ROE	Return on assets
ROAE	Return on average equity
RI	Risk index
RWV	Risk weighted assets
SPDB	Shanghai Pudong Development Bank

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Ostrava dated 12. 04. 2016

Yiping JING 荆一平

Student´s name and surname

List of Annexes

Annexes

Annex 1: Total assets of PBC, ECB and FED from 2005 to Jan 2016 ($ Trillion)

	FED			ECB			PBC	
	Total assets	Mortgage-backed securities	U.S Treasury securities	Total assets	Long-term refinancing operations	Securities held for monetary purpose	Total assets	Foreign exchange
2005	0.848	0.000	0.744	1.21	0.107	0.000	1.253	0.751
2006	0.97	0.000	0.779	1.507	0.158	0.000	1.646	1.080
2007	0.891	0.000	0.755	2.143	0.391	0.000	2.3	1.566
2008	2.24	0.000	0.476	2.729	0.833	0.000	3.024	2.185
2009	2.234	0.908	0.777	3.712	0.974	0.042	3.322	2.557
2010	2.421	0.992	1.016	3.66	0.394	0.178	3.889	3.102
2011	2.926	0.837	1.672	4.429	0.926	0.359	4.44	3.672
2012	2.907	0.927	1.657	3.57	1.342	0.359	4.713	3.787
2013	4.033	1.497	2.209	3.262	0.000	0.311	5.235	4.360
2014	4.498	1.737	2.461	3.209	0.643	0.295	5.446	4.358
2015	4.487	1.748	2.462	3.017	0.512	0.878	4.926	3.852
Jan-2016	4.482	1.744	2.461	2.795	0.512	0.923	5.123	3.680

Annex 2: 12 of top 50 largest banks in 2014 ($ Million)

Bank Name	Country	Assets	Tier 1 Capital	Pre-tax profits	NPL to total loans	Return on assets	Return on capital
ICBC	China	3,368,190	248,608	59,097	1.13%	1.75%	23.77%
CBC	China	2,736,416	202,119	48,878	1.19%	1.79%	24.18%
ABC	China	2,610,582	167,699	37,957	1.54%	1.45%	22.63%
BOC	China	2,492,463	184,231	37,829	1.18%	1.52%	20.53%
JP Morgan	US	2,573,126	186,632	30,547	2.64%	1.19%	16.37%
Bank of America	US	2,106,796	168,973	6,813	3.24%	0.32%	4.03%
Citigroup	US	1,842,530	166,519	13,538	1.95%	0.73%	8.13%
Deutsche Bank	Germany	2,073,669	77,546	3,782	2.69%	0.18%	4.88%
UniCredit	Italy	1,024,536	55,218	4,289	9.90%	0.42%	7.77%
BBVA	Spain	766,920	50,894	4,830	5.80%	0.63%	9.49%
ING Bank	Netherlands	1,005,585	45,024	4,678	3%	0.47%	10.39%
UBS	Switzerland	1,074,295	43,158	2,488	0.85%	0.23%	5.77%

Annex 3: China's benchmark interest rate (%)

	1-year loan prime rate	1-year deposit rate
2008/10/9	6.93	3.87
2008/10/30	6.66	3.6
2008/11/27	5.58	2.52
2008/12/23	5.31	2.25
2010/10/20	5.56	2.5
2010/12/26	5.81	2.75
2011/2/9	6.06	3
2011/4/6	6.31	3.25
2011/7/7	6.56	3.5
2012/6/8	6.31	3.25
2012/7/6	6	3
2014/11/22	5.6	2.75
2015/3/1	5.35	2.50
2015/5/11	5.1	2.25
2015/6/28	4.85	2
2015/8/26	4.6	1.75
2015/10/24	4.35	1.5

Annex 4: Reserve requirement ratio of Chinese financial institutions (%)

	Large financial institutions	Small and medium sized financial institutions
2008/12/25	15.5	13.5
2010/1/18	16	13.5
2010/2/25	16.5	13.5
2010/5/10	17	13.5
2010/11/16	17.5	14
2010/11/29	18	14.5
2010/12/20	18.5	15
2011/1/20	19	15.5
2011/2/24	19.5	15
2011/3/25	20	16.5
2011/4/21	20.5	17
2011/5/18	21	17.5
2011/6/20	21.5	18
2011/12/5	21	17.5
2012/2/24	20.5	17
2012/5/18	20	16.5
2015/2/4	19.5	16
2015/4/20	18.5	15

Annex 5: Financial data of ICBC from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	462,762	589,580	721,439	767,111	849,879
Interest expenses	159,013	226,816	303,611	323,776	356,357
Net interest income	303,749	362,764	417,828	443,335	493,522
Net non-interest income	76,999	107,837	111,892	135,566	141,336
Net fee and commission income	72,840	101,550	106,064	122,326	132,497
Other non-interest related gain	4,159	6,287	5,828	13,240	8,839
Net profit	166,025	208,445	238,691	262,965	276,286
Interest earning assets	12,431,871	13,881,755	15,731,814	17,219,456	18,561,652
Interest earning liabilities	11,601,100	12,905,068	14,469,308	15,820,472	16,844,587
Total assets	13,458,622	15,476,868	17,542,217	18,917,752	20,609,953
Total liabilities	12,636,965	14,519,045	16,413,758	17,639,289	19,072,649
Total equity	821,657	957,823	1,128,459	1,278,463	1,537,304
Profit attribute to ordinary equity holders	165,156	208,265	238,532	262,649	275,811
Weighted average number of ordinary shares	340,599	349,024	349,312	350,068	351,438
Total provision	27,888	31,832	32,572	38,098	56,267
Total loan	6,790,506	7,788,897	8,803,692	9,922,374	11,026,331
Pass/Normal loan	6,489,450	7,484,060	8,501,566	9,632,523	10,582,050
Special mention	227,815	231,826	227,551	196,162	319,784
NPL	73,241	73,011	74,575	93,689	124,497
Substandard	18,932	24,092	29,418	36,532	66,809
Doubtful	41,765	38,712	36,482	43,020	49,359
Loss	12,544	10,207	8,675	14,137	8,329
LLA	167,134	194,878	220,403	240,959	257,581
Deposit	10,385,487	11,364,657	12,509,843	13,843,197	14,627,258
Net tier 1 capital	709,193	850,355	1,010,463	1,266,859	1,521,233
Tier 2 capital	174,505	271,830	298,365	324,806	306,704
Tier 2 capital deduction	11,325	9,722	9,814	19,400	15,800
Net capital base	872,373	1,112,463	1,299,014	1,572,265	1,812,137
Risk weighted assets	7,112,357	8,447,263	9,511,205	11,982,187	12,475,939
Charge off	6,904	4,546	16,500	16,500	38,364

Annex 6: Financial data of ABC from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	357,660	472,921	566,063	613,384	699,289
Interest expenses	115,508	165,722	224,184	237,182	269,398
Net interest income	242,152	307,199	341,879	376,202	429,891
Net non-interest income	46,128	68,750	74,844	83,171	80,123
Net fee and commission income	3,973	3,807	8,241	6,398	14,112
Other non-interest related gain	50,101	72,557	83,085	89,569	94,235
Net profit	94,907	121,956	145,131	166,211	179,510
Interest earning assets	9,420,428	10,773,045	12,147,635	13,463,690	14,697,379
Interest earning liabilities	8,919,066	10,006,661	11,259,203	12,389,369	13,503,621
Total assets	10,337,406	11,677,577	13,244,342	14,562,102	15,974,152
Total liabilities	9,795,170	11,027,789	12,492,988	13,717,565	14,941,533
Total equity	542,236	649,788	751,354	844,537	1,032,619
Profit attribute to ordinary equity holders	94,873	121,927	145,094	166,315	179,461
Weighted average number of ordinary shares	286,784	324,794	324,794	324,794	324,794
Total provision	43,536	54,628	52,126	52,990	65,063
Total loan	4,956,741	5,639,928	6,433,399	7,224,713	8,098,067
Pass/Normal loan	4,539,665	5,237,913	6,052,100	6,860,589	7,661,924
Special mention	316,671	314,657	295,451	276,343	311,173
NPL	100,405	87,358	85,848	87,781	124,970
Substandard	34,987	31,115	29,489	25,388	35,052
Doubtful	57,930	47,082	46,996	52,162	75,669
Loss	7,488	9,161	9,363	10,231	14,249
LLA	168,733	229,842	279,988	322,191	358,071
Deposit	8,887,905	9,622,026	10,862,935	11,811,411	12,533,397
Net tier 1 capital	525,083	607,489	701,293	838,474	1,016,696
Net tier 2 capital	99,815	157,012	214,334	236,493	364,678
Net capital base	624,124	763,010	910,048	1,074,967	1,381,374
Risk weighted assets	5,383,694	6,388,375	7,216,178	9,065,631	10,782,764
Charge off	1,140	283	4,009	9,784	29,222

Annex 7: Financial data of BOC from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	313,533	413,102	506,528	518,993	602,680
Interest expenses	119,571	185,038	249,564	235,410	281,578
Net interest income	193,962	228,064	256,964	283,585	321,102
Net non-interest income	82,556	100,234	109,212	123,924	135,226
Net profit	109,691	130,502	145,522	163,741	177,198
Interest earning assets	9,391,932	10,743,572	11,966,813	12,637,686	14,274,546
Interest earning liabilities	8,826,287	10,098,193	11,315,192	11,871,626	13,428,278
Total assets	10,459,703	11,829,789	12,680,615	13,874,299	15,251,382
Total liabilities	9,782,441	11,072,652	11,819,073	12,912,822	14,067,954
Total equity	676,150	757,137	861,542	961,477	1,183,428
Profit attribute to ordinary equity holders	104,418	124,276	139,432	156,911	169,595
Weighted average number of ordinary shares	264,393	279,123	279,127	279,156	280,009
Total provision	44,999	52,415	51,309	62,386	81,833
Total loan	5,660,621	6,342,814	6,864,696	7,607,791	8,483,275
Pass/Normal loan	5,450,106	6,087,036	6,591,713	7,345,227	8,182,127
Special mention	148,045	192,504	207,535	189,293	200,654
NPL	62,470	63,274	65,448	73,271	100,494
Substandard	28,603	26,153	28,643	33,245	54,369
Doubtful	20,784	24,584	24,276	26,465	24,705
Loss	13,083	12,537	12,529	13,561	21,420
LLA	122,856	139,676	154,656	168,049	188,531
Deposit	7,483,254	8,817,961	9,173,995	10,097,786	10,885,223
Net tier 1 capital	593,787	671,244	764,261	913,646	1,127,312
Tier 2 capital	190,990	234,763	265,997	262,768	250,714
Tier 2 capital deduction	44,073	41,736	41,600	3,067	-
Net capital base	740,704	864,271	988,658	1,173,347	1,378,026
Risk weighted assets	5,887,170	6,656,034	7,253,230	9,418,726	9,934,105
Charge off	5,517	1,809	4,209	9,096	25,731

Annex 8: Financial data of CCB from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	377,783	482,247	603,241	646,253	739,126
Interest expenses	126,283	177,675	250,039	256,709	301,728
Net interest income	251,500	304,572	353,202	389,544	437,398
Net non-interest income	66,132	86,994	93,507	104,283	108,517
Net profit	135,031	169,439	193,602	215,122	228,247
Interest earning assets	10,104,839	11,292,800	12,845,124	14,220,279	15,643,042
Interest earning liabilities	9,427,283	10,452,801	11,815,615	12,992,418	14,306,710
Total assets	10,810,317	12,281,834	13,972,828	15,363,210	16,744,130
Total liabilities	10,109,157	11,465,174	13,023,283	14,288,881	15,491,767
Total equity	701,160	816,660	949,545	1,074,329	1,252,363
Profit attribute to ordinary equity holders	134,844	169,258	193,179	214,657	227,830
Weighted average number of ordinary shares	240,977	250,011	250,011	250,011	250,011
Total provision	38,425	42,628	47,273	53,498	69,009
Total loan	5,669,128	6,496,411	7,512,312	8,590,057	9,474,523
Pass/Normal loan	5,405,694	6,227,770	7,233,287	8,300,113	9,079,893
Special mention	198,722	197,726	204,407	204,680	281,459
NPL	64,712	70,915	74,618	85,264	113,171
Substandard	28,718	38,974	32,745	32,100	55,059
Doubtful	28,923	23,075	33,713	42,231	48,239
Loss	7,071	8,866	8,160	10,933	9,873
LLA	143,102	171,217	202,433	228,696	251,613
Deposit	9,075,369	9,987,450	11,343,079	12,223,037	12,898,675
Net tier 1 capital	625,594	741,585	864,778	1,061,700	1,236,767
Tier 2 capital	144,906	189,855	238,168	255,024	280,161
Tier 2 capital deduction	8,051	6,934	9,517	-	-
Net capital base	762,449	924,506	1,093,429	1,316,724	1,516,928
Risk weighted assets	6,015,329	6,760,117	7,637,705	9,872,790	10,203,643
Charge off	9,277	3,330	6,653	11,868	21,485

Annex 9: Financial data of BOCOM from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	377,783	482,247	603,241	646,253	739,126
Interest expenses	126,283	177,675	250,039	256,709	301,728
Net interest income	251,500	304,572	353,202	389,544	437,398
Net non-interest income	66,132	86,994	93,507	104,283	108,517
Net profit	135,031	169,439	193,602	215,122	228,247
Interest earning assets	10,104,839	11,292,800	12,845,124	14,220,279	15,643,042
Interest earning liabilities	9,427,283	10,452,801	11,815,615	12,992,418	14,306,710
Total assets	10,810,317	12,281,834	13,972,828	15,363,210	16,744,130
Total liabilities	10,109,157	11,465,174	13,023,283	14,288,881	15,491,767
Total equity	701,160	816,660	949,545	1,074,329	1,252,363
Profit attribute to ordinary equity holders	134,844	169,258	193,179	214,657	227,830
Weighted average number of ordinary shares	240,977	250,011	250,011	250,011	250,011
Total provision	38,425	42,628	47,273	53,498	69,009
Total loan	5,669,128	6,496,411	7,512,312	8,590,057	9,474,523
Pass/Normal loan	5,405,694	6,227,770	7,233,287	8,300,113	9,079,893
Special mention	198,722	197,726	204,407	204,680	281,459
NPL	64,712	70,915	74,618	85,264	113,171
Substandard	28,718	38,974	32,745	32,100	55,059
Doubtful	28,923	23,075	33,713	42,231	48,239
Loss	7,071	8,866	8,160	10,933	9,873
LLA	143,102	171,217	202,433	228,696	251,613
Deposit	9,075,369	9,987,450	11,343,079	12,223,037	12,898,675
Net tier 1 capital	625,594	741,585	864,778	1,061,700	1,236,767
Tier 2 capital	144,906	189,855	238,168	255,024	280,161
Tier 2 capital deduction	8,051	6,934	9,517	-	-
Net capital base	762,449	924,506	1,093,429	1,316,724	1,516,928
Risk weighted assets	6,015,329	6,760,117	7,637,705	9,872,790	10,203,643
Charge off	9,277	3,330	6,653	11,868	21,485

Annex 10: Financial data of CMBC from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	84,513	121,245	150,101	173,495	222,834
Interest expenses	27,437	44,938	61,727	74,582	110,834
Net interest income	57,076	76,307	88,374	98,913	112,000
Net non-interest income	11,330	20,359	25,444	34,205	54,525
Net profit	25,769	36,127	45,277	51,742	56,049
Interest earning assets	2,150,615	2,489,714	2,921,423	3,507,220	4,440,702
Interest earning liabilities	2,008,402	2,328,715	2,721,536	3,236,014	4,113,539
Total assets	2,402,507	2,794,971	3,408,219	4,016,399	4,731,829
Total liabilities	2,268,501	2,629,961	3,207,712	3,750,443	4,416,769
Total equity	134,006	165,010	200,507	265,956	315,060
Profit attribute to ordinary equity holders	25,769	36,129	45,273	51,743	55,911
Weighted average number of ordinary shares	20,925	21,577	21,577	22,488	25,220
Total provision	6,241	9,048	6,276	10,927	32,895
Total loan	1,431,451	1,641,075	1,904,463	2,197,094	2,513,919
Pass/Normal loan	1,407,546	1,614,941	1,873,280	2,154,159	2,439,368
Special mention	14,219	16,961	19,489	24,603	46,634
NPL	9,686	9,173	11,694	18,332	27,917
Substandard	2,730	3,186	5,281	9,037	17,343
Doubtful	2,659	2,146	3,064	5,450	7,580
Loss	4,297	3,841	3,349	3,845	2,994
LLA	29,291	36,704	41,138	48,764	65,165
Deposit	1,897,178	2,220,060	2,532,444	2,775,276	3,304,438
Net tier 1 capital	116,329	144,745	189,555	231,379	301,977
Net tier 2 capital	49,625	58,212	62,676	46,331	67,555
Net capital base	165,954	202,957	252,231	277,710	369,532
Risk weighted assets	1,446,883	1,760,884	2,077,755	2,560,011	3,146,571
Charge off	152	583	891	2,134	14,917

Annex 11: Financial data of CMSB from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	70,776	117,281	151,887	182,154	199,052
Interest expenses	24,903	52,460	74,734	99,121	106,916
Net interest income	45,873	64,821	77,153	83,033	92,136
Net non-interest income	8,794	17,375	25,708	33,069	42,871
Net profit	17,581	27,920	37,563	42,278	45,546
Interest earning assets	1,558,093	2,062,831	2,621,107	3,333,532	3,562,539
Interest earning liabilities	1,448,255	1,924,592	2,458,686	3,139,092	3,361,259
Total assets	1,823,737	2,229,064	3,212,001	3,226,210	4,015,136
Total liabilities	1,718,480	2,094,954	3,043,457	3,021,923	3,767,380
Total equity	105,257	134,110	168,544	204,287	247,756
Profit attribute to ordinary equity holders	17,581	27,920	37,563	42,278	44,546
Weighted average number of ordinary shares	26,715	26,715	27,946	34,039	34,043
Total provision	6,237	9,048	6,276	15,091	22,559
Total loan	1,057,571	1,205,221	1,384,610	1,574,263	1,812,666
Pass/Normal loan	1,040,101	1,184,347	1,356,997	1,540,486	1,755,630
Special mention	10,131	13,335	17,090	20,373	35,902
NPL	7,339	7,539	10,523	13,404	21,134
Substandard	3,701	3,915	6,444	9,221	16,591
Doubtful	1,983	2,399	2,676	3,102	3,267
Loss	1,655	1,225	1,403	1,081	1,276
LLA	19,848	26,936	33,098	34,816	38,507
Deposit	1,417,877	1,644,738	1,926,194	2,146,689	2,433,810
Net tier 1 capital	103,426	126,024	164,226	231,680	245,985
Net tier 2 capital	30,346	48,010	52,993	57,106	59,912
Net capital base	133,772	174,034	217,219	288,786	305,897
Risk weighted assets	1,280,847	1,602,301	2,020,011	2,713,315	2,862,710
Charge off	773	583	891	4,049	7,119

Annex 12: Financial data of CITIC from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	72,460	106,623	138,810	163,335	205,639
Interest expenses	24,325	41,517	63,324	77,647	110,898
Net interest income	48,135	65,106	75,486	85,688	94,741
Net non-interest income	8,221	11,986	14,225	19,125	30,098
Net profit	21,779	30,844	31,385	39,717	41,454
Interest earning assets	1,829,344	2,167,788	2,685,089	3,299,941	3,943,793
Interest earning liabilities	1,710,024	2,002,796	2,469,040	3,040,167	3,665,163
Total assets	2,081,314	2,765,881	2,959,939	3,641,193	4,138,815
Total liabilities	1,956,776	2,587,100	2,756,853	3,410,468	3,871,469
Total equity	124,538	178,781	203,086	230,725	267,346
Profit attribute to ordinary equity holders	21,509	30,819	31,032	39,175	40,692
Weighted average number of ordinary shares	39,033	43,357	46,787	46,787	46,787
Total provision	4,238	5,734	12,804	11,327	22,074
Total loan	1,264,245	1,434,037	1,662,901	1,941,175	2,187,908
Pass/Normal loan	1,244,478	1,410,760	1,631,235	1,898,053	2,091,293
Special mention	11,234	14,736	19,411	23,156	68,161
NPL	8,533	8,541	12,255	19,966	28,454
Substandard	2,339	3,740	6,448	11,680	14,618
Doubtful	4,870	3,827	4,778	6,310	11,773
Loss	1,324	974	1,029	1,976	2,063
LLA	18,219	23,258	35,325	41,254	51,576
Deposit	1,730,816	1,968,051	2,255,141	2,651,678	2,849,574
Net tier 1 capital	116,988	169,466	193,982	228,380	264,582
Net tier 2 capital	39,626	40,402	69,459	63,832	98,266
Net capital base	156,614	209,868	263,441	292,212	362,848
Risk weighted assets	1,385,262	1,702,165	1,948,636	2,600,494	2,941,627
Charge off ratio	1,105	683	742	5,305	11,610

Annex 13: Financial data of SPDB from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	72,967	121,222	150,243	177,804	212,015
Interest expenses	27,763	59,780	76,881	92,627	113,832
Net interest income	45,204	61,442	73,362	85,177	98,183
Net non-interest income	6,716	6,477	9,590	14,838	24,998
Net profit	19,177	35,757	34,042	41,200	47,360
Interest earning assets	1,815,422	2,363,154	2,843,488	3,462,480	3,927,320
Interest earning liabilities	1,714,520	2,206,172	2,656,789	3,221,625	3,638,589
Total assets	2,191,411	2,684,694	3,145,707	3,680,125	4,195,924
Total liabilities	2,068,131	2,535,151	2,966,048	3,472,898	3,932,639
Total equity	123,280	149,543	179,659	207,227	263,285
Profit attribute to ordinary equity holders	19,177	27,286	34,186	40,922	47,026
Weighted average number of ordinary shares	15,545	18,653	18,653	18,653	18,653
Total provision	4,533	7,160	7,604	10,419	21,919
Total loan	1,146,489	1,331,436	1,544,553	1,767,494	2,028,380
NPL	5,879	5,827	8,940	13,061	21,585
LLA	22,376	29,112	35,747	41,749	53,766
Deposit	1,640,460	1,851,055	2,134,365	2,419,696	2,724,004
Net tier 1 capital	119,823	144,808	168,072	201,135	240,443
Net tier 2 capital	34,023	54,956	65,345	57,180	77,075
Net capital base	153,846	199,764	233,417	258,315	317,518
Risk weighted assets	1,278,361	1,560,180	1,857,066	2,381,451	2,822,985
Charge off	420	509	1,007	2,952	7,423

Annex 14: Financial data of GDB from 2010 to 2014 (RMB Million)

	2010	2011	2012	2013	2014
Interest income	30,912	42,572	52,110	65,742	84,204
Interest expenses	11,550	18,863	27,514	39,740	54,967
Net interest income	19,362	23,709	24,596	26,002	29,237
Net non-interest income	2,366	4,165	5,873	9,057	14,639
Net profit	6,189	9,586	11,220	11,583	12,037
Interest earning assets	716,870	808,790	975,870	1,303,412	1,580,320
Interest earning liabilities	683,353	758,760	906,934	1,230,887	1,498,411
Total assets	814,390	918,982	1,168,150	1,469,850	1,648,056
Total liabilities	771,508	866,276	1,104,622	1,396,559	1,560,608
Total equity	42,882	52,706	63,528	73,291	87,448
Profit attribute to ordinary equity holders	6,189	9,586	11,220	11,583	12,037
Weighted average number of ordinary shares	13,454	15,402	15,402	15,402	15,402
Total provision	3,522	3,267	4,149	5,478	9,995
Total loan	466,839	540,163	615,750	714,711	790,938
Pass/Normal loan	451,987	520,509	593,546	692,885	750,848
Special mention	7,472	12,423	13,093	15,626	31,883
NPL	7,380	7,231	9,111	6,201	8,208
Substandard	1,582	2,002	3,953	3,048	2,414
Doubtful	4,609	3,789	3,997	1,452	3,158
Loss	1,190	1,440	1,161	1,701	2,636
LLA	15,387	16,718	15,489	11,172	12,986
Deposit	628,860	742,538	856,166	994,927	1,090,321
Net tier 1 capital	42,642	52,235	63,360	72,422	86,366
Net tier 2 capital	13,975	19,788	21,935	14,471	25,278
Net capital base	56,617	72,023	85,295	86,893	111,644
Risk weighted assets	513,759	648,878	756,592	965,193	1,063,480
Charge off	1,587	1,189	2,578	6,843	6,866

Annex 15: Financial indicators of selected banks from 2010 to 2014

ROE										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	20.21%	17.50%	16.22%	19.26%	17.46%	19.23%	16.70%	17.49%	15.56%	14.43%
2011	21.76%	18.77%	17.24%	20.75%	18.60%	21.89%	20.82%	17.25%	23.91%	18.19%
2012	21.15%	19.32%	16.89%	20.39%	15.30%	22.58%	22.29%	15.45%	18.95%	17.66%
2013	20.57%	19.68%	17.03%	20.02%	14.78%	19.46%	20.70%	17.21%	19.88%	15.80%
2014	17.97%	17.38%	14.97%	18.23%	13.90%	17.79%	18.38%	15.51%	17.99%	13.76%

ROAE										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	22.13%	21.44%	17.96%	21.43%	20.12%	22.73%	18.11%	18.81%	20.04%	19.02%
2011	23.43%	20.46%	18.21%	22.33%	20.44%	24.16%	23.33%	20.34%	26.21%	20.06%
2012	22.88%	20.72%	17.98%	21.92%	17.84%	24.77%	24.82%	16.44%	20.68%	19.31%
2013	21.85%	20.83%	17.96%	21.26%	15.52%	22.18%	22.68%	18.31%	21.30%	16.93%
2014	19.62%	19.13%	16.52%	19.62%	14.71%	19.29%	20.15%	16.65%	20.13%	14.98%

ROA										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	1.23%	0.92%	1.05%	1.25%	0.99%	1.07%	0.96%	1.05%	0.88%	0.76%
2011	1.35%	1.04%	1.10%	1.38%	1.10%	1.29%	1.25%	1.12%	1.33%	1.04%
2012	1.36%	1.10%	1.15%	1.39%	1.11%	1.33%	1.17%	1.06%	1.08%	0.96%
2013	1.39%	1.14%	1.18%	1.40%	1.05%	1.29%	1.31%	1.09%	1.12%	0.79%
2014	1.34%	1.12%	1.16%	1.36%	1.05%	1.18%	1.13%	1.00%	1.13%	0.73%

Net interest margin										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	2.44%	2.57%	2.07%	2.49%	2.46%	2.65%	2.94%	2.63%	2.49%	2.70%
2011	2.61%	2.85%	2.12%	2.70%	2.61%	3.06%	3.14%	3.00%	2.60%	2.93%
2012	2.66%	2.81%	2.15%	2.75%	2.59%	3.03%	2.94%	2.81%	2.58%	2.52%
2013	2.57%	2.79%	2.24%	2.74%	2.52%	2.82%	2.49%	2.60%	2.46%	1.99%
2014	2.66%	2.92%	2.25%	2.80%	2.36%	2.52%	2.59%	2.40%	2.50%	1.85%

Net non-interest margin										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	0.62%	0.49%	0.88%	0.65%	0.42%	0.53%	0.56%	0.45%	0.37%	0.33%
2011	0.78%	0.64%	0.93%	0.77%	0.47%	0.82%	0.84%	0.55%	0.27%	0.51%
2012	0.71%	0.62%	0.91%	0.73%	0.45%	0.87%	0.98%	0.53%	0.34%	0.60%
2013	0.79%	0.62%	0.98%	0.73%	0.50%	0.98%	0.99%	0.58%	0.43%	0.69%
2014	0.76%	0.55%	0.95%	0.69%	0.52%	1.23%	1.20%	0.76%	0.64%	0.93%

Average yield on interest earning assets										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	3.72%	3.80%	3.34%	3.74%	4.11%	3.93%	4.54%	3.96%	4.02%	4.31%
2011	4.25%	4.39%	3.85%	4.27%	4.84%	4.87%	5.69%	4.92%	5.13%	5.26%
2012	4.59%	4.66%	4.23%	4.70%	5.19%	5.14%	5.79%	5.17%	5.28%	5.34%
2013	4.45%	4.56%	4.11%	4.54%	4.99%	4.95%	5.46%	4.95%	5.14%	5.04%
2014	4.58%	4.76%	4.22%	4.72%	5.04%	5.02%	5.59%	5.21%	5.40%	5.33%

Average cost on interest bearing liabilities										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	1.37%	1.30%	1.35%	1.34%	1.72%	1.37%	1.72%	1.42%	1.62%	1.69%
2011	1.76%	1.66%	1.83%	1.70%	2.33%	1.93%	2.73%	2.07%	2.71%	2.49%
2012	2.10%	1.99%	2.21%	2.12%	2.76%	2.27%	3.04%	2.56%	2.89%	3.03%
2013	2.05%	1.91%	1.98%	1.98%	2.67%	2.30%	3.16%	2.55%	2.88%	3.23%
2014	2.12%	2.00%	2.10%	2.11%	2.88%	2.69%	3.18%	3.03%	3.13%	3.67%

Provosioning rate										
	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	0.41%	0.88%	0.79%	0.68%	0.55%	0.44%	0.59%	0.34%	0.40%	0.75%
2011	0.41%	0.97%	0.83%	0.66%	0.49%	0.55%	0.75%	0.40%	0.54%	0.60%
2012	0.37%	0.81%	0.75%	0.63%	0.49%	0.33%	0.45%	0.77%	0.49%	0.67%
2013	0.38%	0.73%	0.82%	0.62%	0.56%	0.50%	0.96%	0.58%	0.59%	0.77%
2014	0.51%	0.80%	0.96%	0.73%	0.60%	1.31%	1.24%	1.01%	1.08%	1.26%

NPL ratio

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	1.08%	2.03%	1.10%	1.14%	1.12%	0.68%	0.69%	0.67%	0.51%	1.58%
2011	0.94%	1.55%	1.00%	1.09%	0.86%	0.56%	0.63%	0.60%	0.44%	1.34%
2012	0.85%	1.33%	0.95%	0.99%	0.92%	0.61%	0.76%	0.74%	0.58%	1.48%
2013	0.94%	1.22%	0.96%	0.99%	1.05%	0.83%	0.85%	1.03%	0.74%	0.87%
2014	1.13%	1.54%	1.18%	1.19%	1.25%	1.11%	1.17%	1.30%	1.06%	1.04%

Coverage ratio

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	228.20%	168.05%	196.66%	221.14%	185.84%	302.41%	270.45%	213.51%	380.61%	208.50%
2011	266.92%	263.10%	220.75%	241.44%	256.37%	400.13%	357.29%	272.31%	499.61%	231.20%
2012	295.55%	326.14%	236.30%	271.29%	250.68%	351.79%	314.53%	288.25%	399.85%	170.00%
2013	257.19%	367.04%	229.35%	268.22%	213.65%	266.00%	259.74%	206.62%	319.65%	180.16%
2014	206.90%	286.53%	187.60%	222.33%	178.88%	233.42%	182.20%	181.26%	249.09%	158.21%

Tier 1 ratio

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	9.97%	9.75%	10.09%	10.40%	9.37%	8.04%	8.07%	8.45%	9.37%	8.30%
2011	10.07%	9.51%	10.08%	10.97%	9.27%	8.22%	7.87%	9.96%	9.28%	8.05%
2012	10.62%	9.72%	10.54%	11.32%	11.24%	9.12%	8.13%	9.95%	9.05%	8.37%
2013	10.57%	9.25%	9.70%	10.75%	9.76%	9.04%	8.54%	8.78%	8.45%	7.50%
2014	12.19%	9.43%	11.35%	12.12%	11.30%	9.60%	8.59%	8.99%	8.52%	8.12%

Capital adequacy

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	12.27%	11.59%	12.58%	12.68%	12.59%	11.47%	10.44%	11.31%	12.03%	11.02%
2011	13.17%	11.94%	12.98%	13.68%	12.61%	11.53%	10.86%	12.33%	12.80%	11.10%
2012	13.66%	12.61%	13.63%	14.32%	14.49%	12.14%	10.75%	13.52%	12.57%	11.27%
2013	13.12%	11.86%	12.46%	13.34%	12.08%	10.85%	10.64%	11.24%	10.85%	9.00%
2014	14.53%	12.81%	13.87%	14.87%	14.04%	11.74%	10.69%	12.33%	11.25%	10.50%

Loan to deposit

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	65.38%	55.77%	75.64%	62.47%	78.00%	75.45%	74.59%	73.04%	69.89%	74.24%
2011	68.54%	58.61%	71.93%	65.05%	78.03%	73.92%	73.28%	72.87%	71.93%	72.75%
2012	70.37%	59.22%	74.83%	66.23%	79.05%	75.20%	71.88%	73.74%	72.37%	71.92%
2013	71.68%	61.17%	75.34%	70.28%	78.56%	79.17%	73.33%	73.21%	73.05%	71.84%
2014	75.38%	64.61%	77.93%	73.45%	85.16%	76.08%	74.48%	76.78%	74.46%	72.54%

RI(%)

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	40.2203	34.55915	42.52422	42.7217	37.2581	36.7314	37.98216	39.3645	37.0606	34.6908
2011	57.4917	51.64039	59.44217	61.76413	54.984	54.7983	55.91279	59.9994	51.7333	53.3122
2012	63.684	56.15682	67.24953	67.34857	71.6074	58.2367	51.99706	67.9428	56.553	53.8789
2013	70.5024	60.49019	72.27535	72.90111	73.7355	69.0423	66.01774	66.122	58.7172	52.0424
2014	66.6696	47.72326	69.35066	66.84832	67.5633	59.52	55.14093	57.7326	56.0346	47.4552

P(BV)

	ICBC	ABC	BOC	CCB	BOCOM	CMBC	CMSB	CITIC	SPDB	GDB
2010	0.12%	0.17%	0.11%	0.11%	0.14%	0.15%	0.14%	0.13%	0.15%	0.17%
2011	0.06%	0.07%	0.06%	0.05%	0.07%	0.07%	0.06%	0.06%	0.07%	0.07%
2012	0.05%	0.06%	0.04%	0.04%	0.04%	0.06%	0.07%	0.04%	0.06%	0.07%
2013	0.04%	0.05%	0.04%	0.04%	0.04%	0.04%	0.05%	0.05%	0.06%	0.07%
2014	0.04%	0.09%	0.04%	0.04%	0.04%	0.06%	0.07%	0.06%	0.06%	0.09%